ORDER NO. SD83072603A4

Service Manual

QUARTZ Synthesizer FM/AM Stereo Receiver

SA-810

[PA], [PC], [PE]

SA-810(K)

[PC]

*The colors of this model include silver and black.
*The black type model is provided with (K) in the Service Manual.

Areas

* [PA] is available in Far East PX.
* [PE] is available in European Military.
* [PC] is available in European Audio club.

Please use this manual together with the service manual for Model No. SA-810, Order No. SD83032428C1.

CHANGES

■ Specifications

SA-810 (ORDER NO. SD83032428C1)

■ FM TUNER SECTION

Frequency range:	87.9 ~ 107.9 MHz

■ AM TUNER SECTION

Frequency range:	530 ~ 1620 kHz

■ GENERAL

Power consumption:	310W, 380VA
Power supply:	AC120V, 60 Hz
Weight:	8.9 kg (19.1 lb.)

SA-810/(K) [PA,PC,PE]

■ FM TUNER SECTION

Frequency range:	87.50 ~ 108 MHz (50 kHz step).

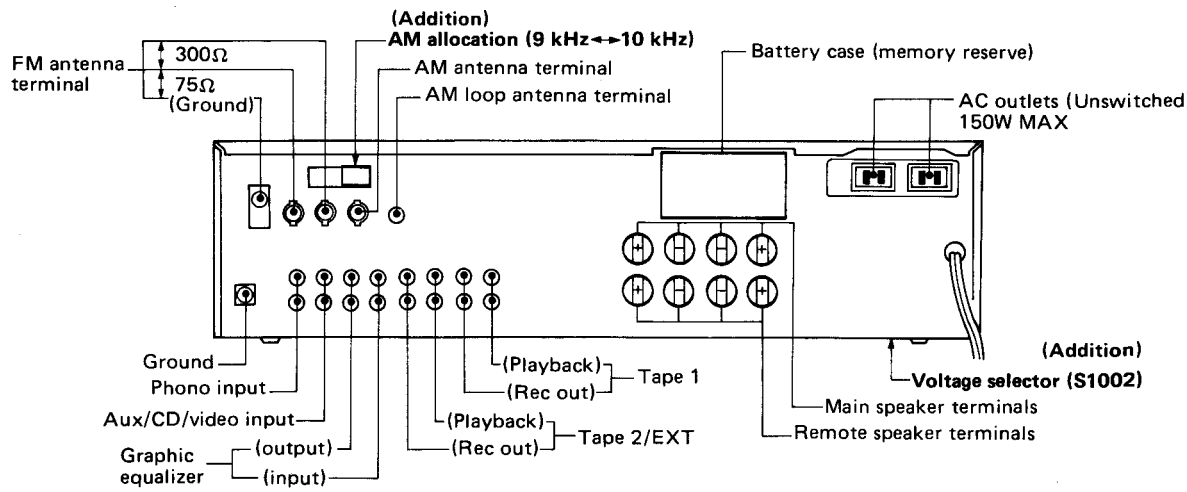
■ AM TUNER SECTION

Frequency range:	522 ~ 1611 kHz (9 kHz step) 530 ~ 1620 kHz (10 kHz step)

■ GENERAL

Power consumption:	460W
Power supply:	AC50Hz/60Hz,110V/120V/220V/240V
Weight:	9.4 kg (20.7 lg)

■ LOCATION OF CONTROLS



Technics

Matsushita Electric Trading Co., Ltd.
P.O. Box 288, Central Osaka Japan

Panasonic Tokyo
Matsushita Electric Industrial Co., Ltd.
1-2, 1-chome, Shibakoen, Minato-ku, Tokyo 105 Japan

■ REPLACEMENT PARTS LIST

Notes:

(1) Mentioned in this parts list are only those changed in Model No. SA-810 for destination [M] area.

(2) Important safety notice:
Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.

(3) The "Ⓢ" mark is service standard parts and may differ from production parts.

(4) "Ⓚ" marked parts are used for black type only, while " O " marked parts are for silver type only.

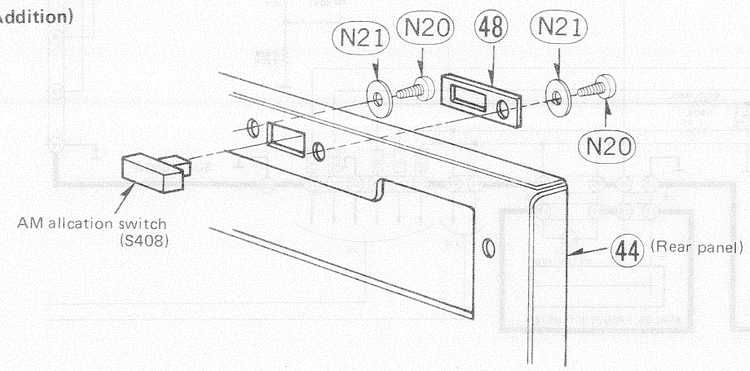
(5) Parts other than "Ⓚ" and " O " marked are used for both black and silver types.

Ref. No.	Change of Part No. SA-810 [M]	➡ SA-810/(K) [PA, PC, PE]	Description	Pcs/Set	Remarks
TRANSISTORS					
Q905	Addition	2SC1685—Q	Buffer	1	Ⓢ
Q906	Addition	2SA564AQ	Buffer	1	Ⓢ
DIODES					
D203 Ⓚ	LN346GP	LN446YP	LED, Signal Strength Ind. (Black type)	1	
D212	MA162A	Deletion	————	0	
D302	MA162A	Delection	————	0	
D415 Ⓚ	LN0603GP3G	LN0603YP4	LED, New Class A Ind. (Black type)	1	⚠
D914, 916	Addition	MA162A	Switching	2	Ⓢ
COIL and TRANSFORMER					
L203	Addition	SLQZ10G1—D	Coil, Choke	1	
T1001	SLT5N421	SLT5P235	Transformer, Power Source	1	⚠
METER					
O	SSM175—4	SSM175—7	Analog Frequency Meter (Silver type)	1	
Ⓚ		SSM175—4	Analog Frequency Meter (Black type)	1	
FUSES					
F1	XBA1F50NU14	XBA2C40TR0	250V, T4A	1	⚠
F2	Addition	XBA2C20TR0	250V, T2A	1	⚠
SWITCHES					
S408	Addition	SSS43	AM Allocation	1	
S1002	Addition	ESE37219	Voltage Selector	1	⚠
THERMISTER					
TH201	Addition	ERTD2FHL103S	10kΩ	1	
RESISTORS					
R208	ERD25FJ103	ERD25TJ153	Carbon, 15kΩ, 1/4W, ±5%	1	Ⓢ
R461, 462	Addition	ERD25FJ331	Carbon, 330Ω, 1/4W, ±5%	2	Ⓢ
R854	ERD25FJ473	ERDS1FJ2R2	Carbon, 2.2Ω, 1/2W, ±5%	1	⚠
R915	Addition	ERD25TJ104	Carbon, 100kΩ, 1/4W, ±5%	1	Ⓢ
R916	Addition	ERD25TJ273	Carbon, 27kΩ, 1/4W, ±5%	1	Ⓢ
R917	Addition	ERD25TJ104	Carbon, 100kΩ, 1/4W, ±5%	1	Ⓢ
R918	Addition	ERD25TJ224	Carbon, 220kΩ, 1/4W, ±5%	1	Ⓢ
R919	Addition	ERD25TJ824	Carbon, 820kΩ, 1/4W, ±5%	1	Ⓢ
R1001	ERC12ZGK335	Delection	————	0	
CAPACITORS					
C237	ECKD1H103ZF	Delection	————	0	
C298, 299	ECKD1H103ZF	Delection	————	0	
C696	ECKD1H103ZF	Delection	————	0	

Ref. No.	Change of Part No. SA-810 [M]	Change of Part No. SA-810/(K) [PA, PC, PE]	Description	Pcs/Set	Remarks
1 Ⓚ	SGW4650PB	SGW4650BB	Front Panel (Black type)	1	
2 ○	SGU347SA	SGU347SB	Transparent Panel (Siver type)	1	
2 Ⓚ		SGU347BA	Transparent Panel (Black type)	1	
3 Ⓚ	SBD69–2M	SBD69–1M	Knob (Black type)	3	
5 ○	SGXA810M	SGXA810–SP	Front Sub Panel (Silver type)	1	
5 Ⓚ		SGXA810–KP	Front Sub Panel (Black type)	1	
13 Ⓚ	SGX7515	SGX7515–1	Ornament, (Black type)	1	
14 Ⓚ	SDU89–1	SDU89–2	Filter, FL (Black type)	1	
16 Ⓚ	SKC1430S1	SKC1430BB1	Cabinet (Black type)	1	
21	SML137	SMLA810–SP	Bracket, Power Transformer	1	
33	RHR111	SHR127	Bushing, AC Cord	1	
34	RJA9Y	RJA52Y	AC Cord	1	⚠Ⓢ
44	SGP3730–2A	SGP3730–6A	Rear Panel	1	
46	SKU10530	SKUA810–SP	Bottom Board	1	
48	Addition	SHR5025–1	Spacer, AM Allocation Switch	1	
SCREWS					
N4 Ⓚ	SNE2095–2	SNE2095–3	Tapping, (Black type)	4	
N5 Ⓚ	XTB3+8BFN	XTB3+8BFZ	Tapping, (Black type)	3	Ⓢ
N9	XTB4+8BFZ	XYA4+FF10FZ	Tapping, Power Transformer	4	
N20	Addition	XSN26+5FZ	⊕ 2.6x5, Allocation Switch	2	
WASHERS					
N21	Addition	XWA26BFZ	φ2.6, Allocation Switch	2	Ⓢ
ACCESSORIES					
A6 [PA, PE]	SQF11681	SQF11849	Instruction Book	1	
A6 [PC]		SQF11849–1	Instruction Book	1	
A7	Addition	SJP9215	Plug Adaptor, AC Power	1	⚠
PACKING PARTS					
P1 Ⓚ	SPP701	SPP689	Polyethylene Bag (Black type)	1	
P5	SPG4393	SPG4499	Carton Box	1	
P6 Ⓚ	Addition	SGK1413	Label	2	

■ EXPLODED VIEW

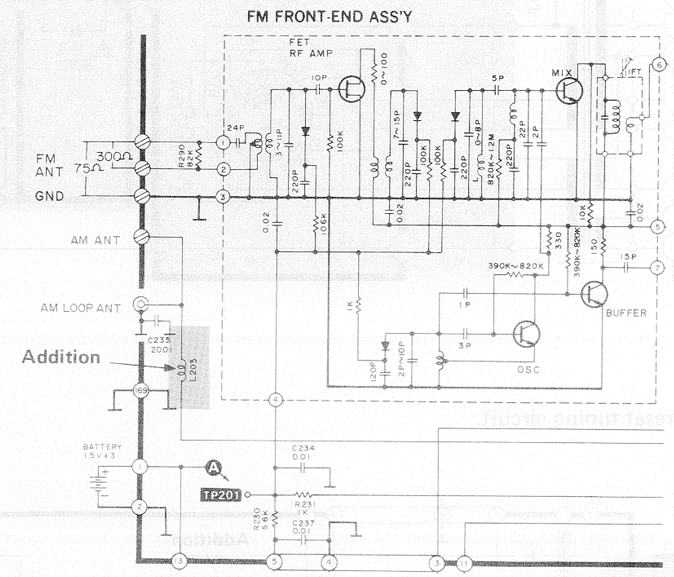
(Addition)

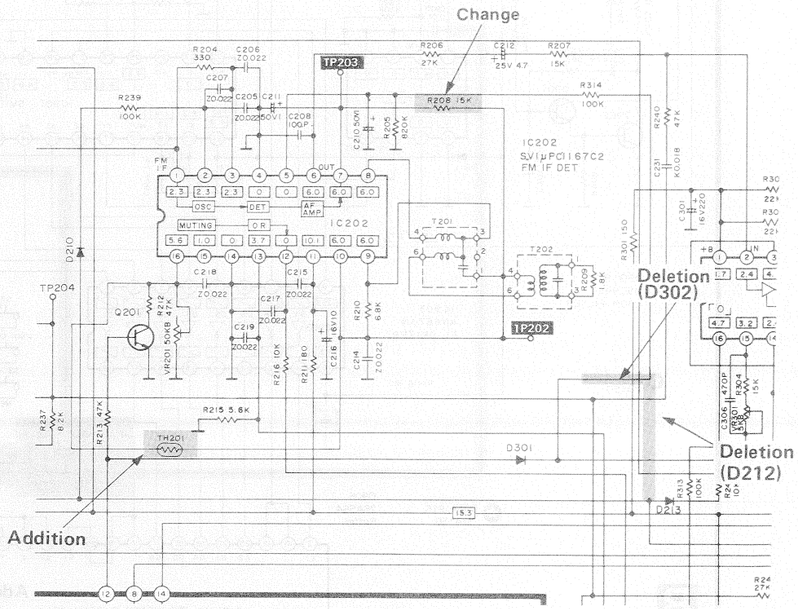


■ CHANGE OF SCHEMATIC DIAGRAM

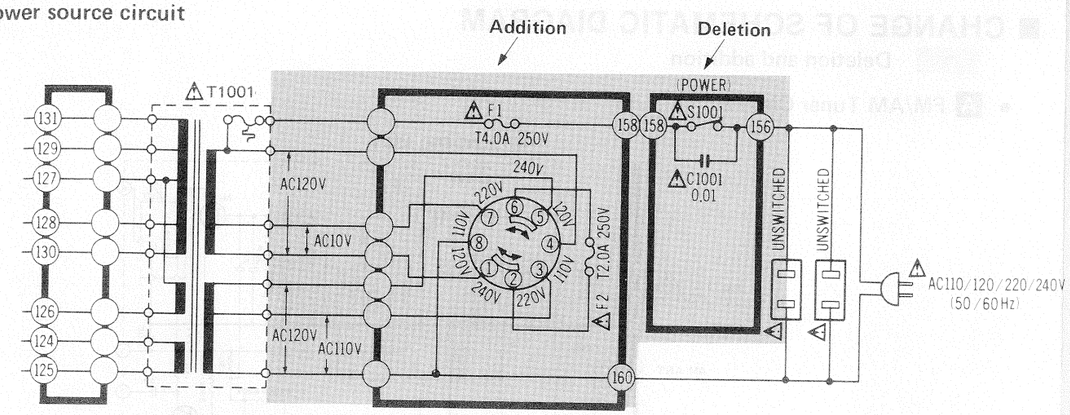
Deletion and addition

- **A** FM/AM Tuner Circuit

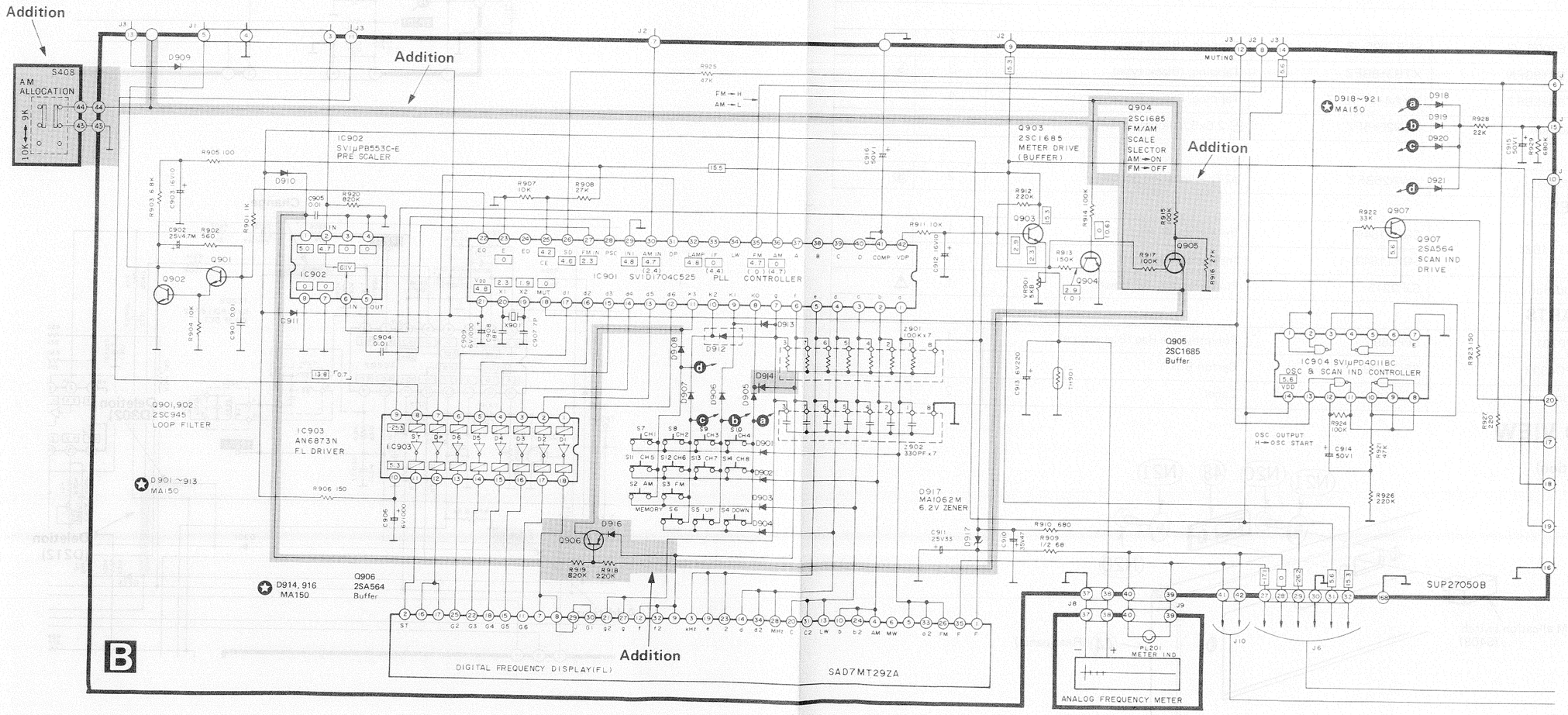




- Power source circuit



- B FM/AM Preset tuning circuit.



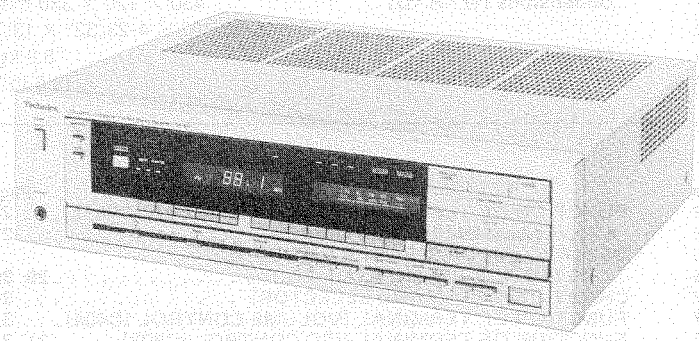
ORDER NO. SD83032428C1

Service Manual

QUARTZ Synthesizer FM/AM Stereo Receiver

SA-810

[M], [MC]



Areas

* [M] is available in U.S.A.
* [MC] is available in Canada.

Specifications (IHF '78)

(Specifications are subject to change without notice for further improvement.)

■ AMPLIFIER SECTION

Rated minimum sine wave RMS power output
20 Hz~20 kHz both channels driven
0.005% total harmonic distortion
80W per channel (8 ohms)

1 kHz continuous power output both channels driven 0.005% total harmonic distortion	85W per channel (8 ohms)
Dynamic headroom	1.9 dB (8 ohms)
Total harmonic distortion	
rated power at 20 Hz~20 kHz	0.005% (8 ohms)
half power at 20 Hz~20 kHz	0.005% (8 ohms)
half power at 1 kHz	0.001% (8 ohms)
SMPTE intermodulation distortion	0.01% (8 ohms)
Frequency response	
PHONO	RIAA standard curve ±0.8 dB
AUX/CD/VIDEO, GRAPHIC EQ, TAPE 1, 2/EXT	5 Hz~100 kHz, −3 dB
Input sensitivity	
PHONO	0.28 mV (2.5 mV, IHF '66)
AUX/CD/VIDEO, GRAPHIC EQ, TAPE 1, 2/EXT	17 mV (150 mV, IHF '66)
S/N (IHF, A)	
PHONO	73 dB (81 dB, IHF '66)
AUX/CD/VIDEO, GRAPHIC EQ, TAPE 1, 2/EXT	75 dB (90 dB, IHF '66)
Maximum input voltage	
PHONO	170 mV (170 mV, 1 kHz)
Input impedance	
PHONO	47 kilohms
AUX/CD/VIDEO, GRAPHIC EQ, TAPE 1, 2/EXT	15 kilohms
Tone controls	
BASS	50 Hz, +10 dB~ −10 dB
TREBLE	20 kHz, +10 dB~ −10 dB
Subsonic filter	30 Hz, −6 dB/oct.
High filter	7 kHz, −6 dB/oct.
Loudness control (volume at −30 dB)	50 Hz, +9 dB
AF muting	−20 dB
Low frequency damping factor	40 (8 ohms)
	20 (4 ohms)
Load impedance	
MAIN or REMOTE	4~16 ohms
MAIN and REMOTE	8~16 ohms

■ FM TUNER SECTION

Frequency range	87.9~107.9 MHz
Sensitivity	10.8 dBf (1.9 μV, IHF '58)
50 dB quieting sensitivity	
MONO	16.1 dBf (3.5 μV IHF '58)
STEREO	38.3 dBf (45 μV IHF '58)
Total harmonic distortion	
100 Hz	0.08% (MONO), 0.2% (STEREO)
1 kHz	0.08% (MONO), 0.15% (STEREO)
6 kHz	0.2% (MONO), 0.3% (STEREO)
S/N	
MONO	78 dB
STEREO	72 dB
Frequency response	20 Hz~15 kHz, +1 dB, −2 dB
Alternate channel selectivity	80 dB
Capture ratio	1 dB
Image rejection at 98 MHz	75 dB
IF rejection at 98 MHz	100 dB
Spurious response rejection at 98 MHz	100 dB
AM suppression	55 dB
Stereo separation	
1 kHz	45 dB
10 kHz	35 dB

Technics

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Victoria Industrial Park
Carolina, Puerto Rico 00630

Carrier leak	
19 kHz	−40 dB
38 kHz	−55 dB
Antenna terminals	300 ohms (balanced) 75 ohms (unbalanced)

■ AM TUNER SECTION

Frequency range	530~1620 kHz
Sensitivity	20 μV, 300 μV/m
Selectivity	55 dB
Image rejection at 1000 kHz	40 dB
IF rejection at 1000 kHz	40 dB

■ GENERAL

Power consumption	310W, 380 VA
Power supply	AC 120V, 60 Hz
Dimensions (W×H×D)	430 × 120 × 330 mm (16-15/16" × 4-23/32" × 13")
Weight	8.9 kg (19.6 lb.)

■ CONTENTS

Page

SAFETY PRECAUTION 2
LOCATION OF CONTROLS 3
HOW TO OPERATE . . . . . 4 ~ 6
HOW TO USE THE AM LOOP ANTENNA 5, 6
PROTECTION CIRCUITRY 7
BEFORE REPAIR AND ADJUSTMENT 7
DISASSEMBLY INSTRUCTIONS . . . . . 7 ~ 9
MEASUREMENTS AND ADJUSTMENTS . . . . . 10 ~ 14
RESISTORS & CAPACITORS 15, 16
PRINTED CIRCUIT BOARDS . . . . . 17 ~ 22
CIRCUIT BOARDS AND WIRING CONNECTION DIAGRAM (Top view) . . . . . 23 ~ 25
BLOCK DIAGRAM
- Tuner 26, 27
- Input selector circuit ~ power supply circuit . . . . . 35 ~ 37

Page

FUNCTION OF TERMINAL (PLL CONTROLLER IC901) 28
- Fluorescent Display Tube (FL) 29

DESCRIPTION OF SPEAKER IMPEDANCE DETECTION CIRCUIT 29, 30
CHART OF IC403 (BAND SELECTOR) 31
FUNCTION OF TERMINAL (VOLUME CONTROL IC404) . . . 31
FUNCTION OF TERMINAL (ICQ CONTROL IC503) 31, 32
- ON-time of each indicator, and output generated at pin terminal of microcomputer (IC503) 32

OPERATION OF ICQ CONTROLLER 33, 34
SCHEMATIC DIAGRAM . . . . . 38 ~ 46
REPLACEMENT PARTS LIST 47, 48
EXPLODED VIEWS 49, 50

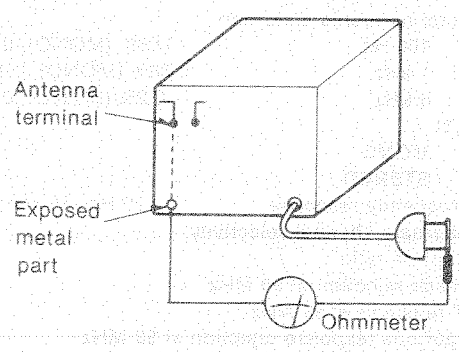
■ SAFETY PRECAUTION

1. Before servicing, unplug the power cord to prevent an electric shock.
2. When replacing parts, use only manufacturer's recommended components for safety.
3. Check the condition of the power cord. Replace if wear or damage is evident.
4. After servicing, be sure to restore the lead dress, insulation barriers, insulation papers, shields, etc.
5. Before returning the serviced equipment to the customer, be sure to make the following insulation resistance test to prevent the customer from being exposed to a shock hazard.

• INSULATION RESISTANCE TEST

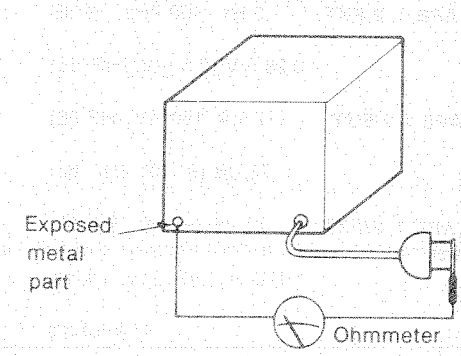
1. Unplug the power cord and short the two prongs of the plug with a jumper wire.
2. Turn on the power switch.
3. Measure the resistance value with ohmmeter between the jumpered AC plug and each exposed metal cabinet part, such as screwheads antenna, control shafts, handle brackets, etc. Equipment with antenna terminals should read between 3MΩ and 5.2MΩ to all exposed parts. (Fig. A) Equipment without antenna terminals should read approximately infinity to all exposed parts. (Fig. B)

Note: Some exposed parts may be isolated from the chassis by design. These will read infinity.



(Fig. A)

Resistance = 3MΩ—5.2MΩ

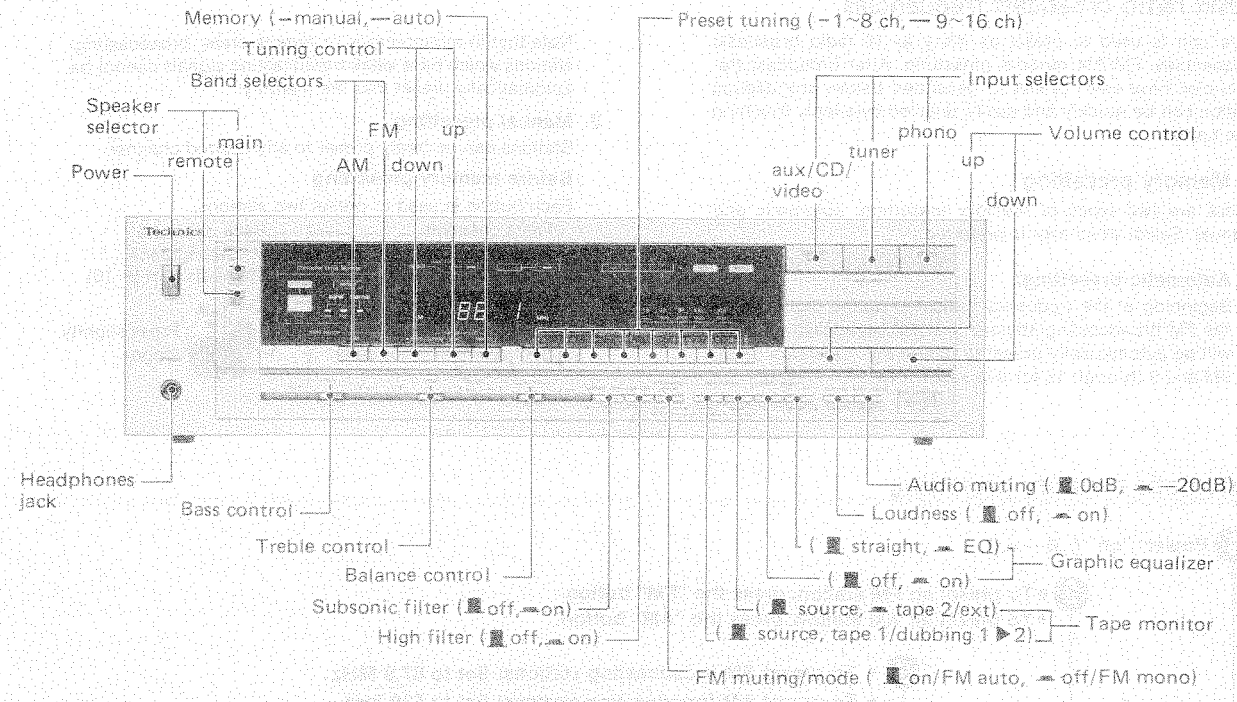


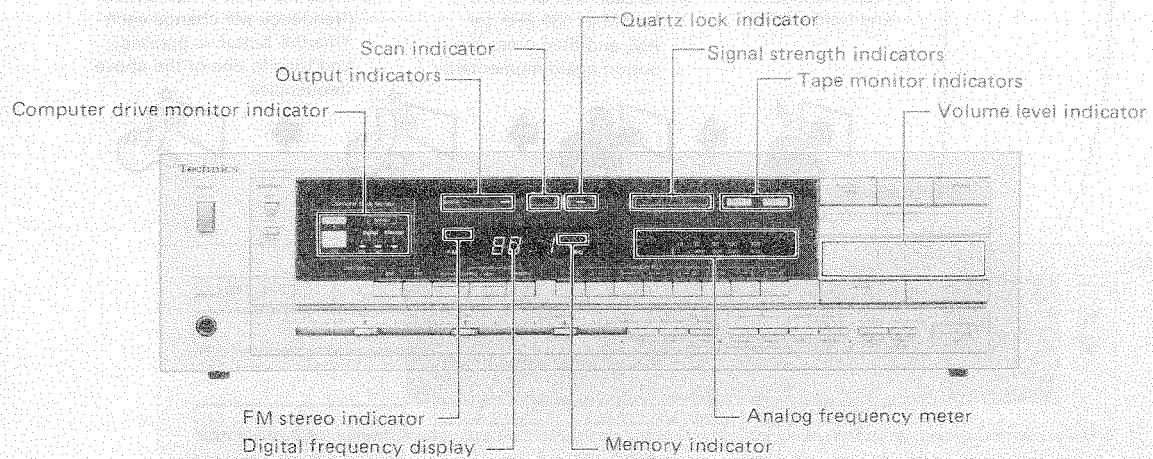
(Fig. B)

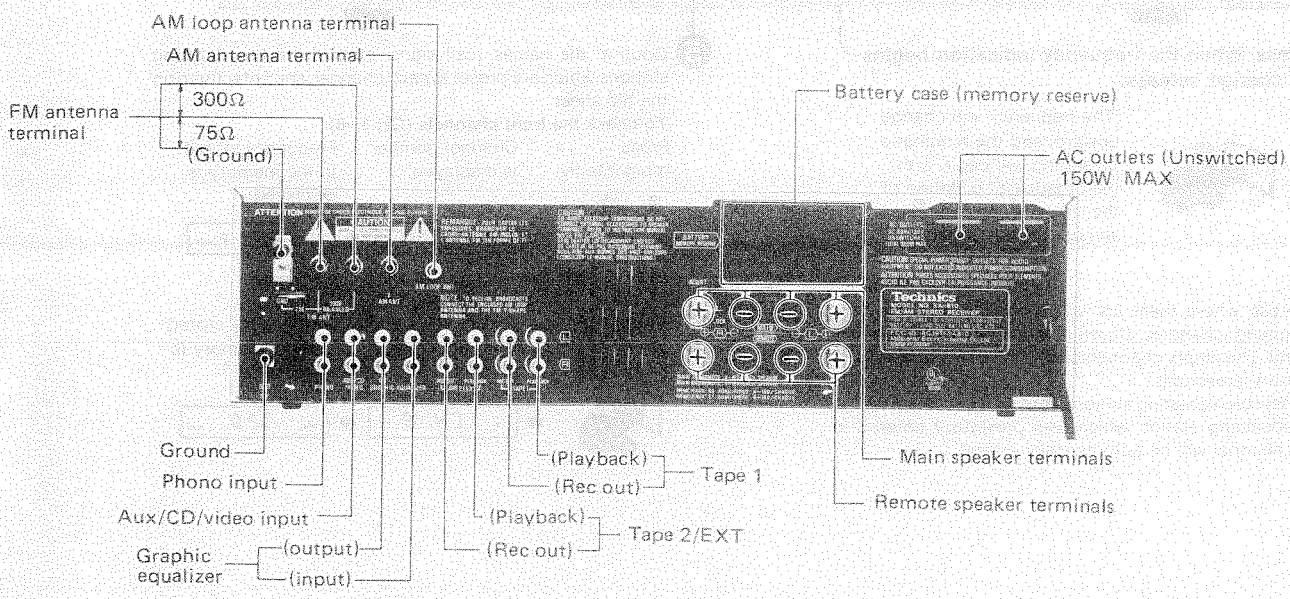
Resistance = Approx. ∞

4. If the measurement is outside the specified limits, there is a possibility of a shock hazard. The equipment should be repaired and rechecked before it is returned to the customer.

LOCATION OF CONTROLS







* Phono input capacitance is about 150pF.

■ HOW TO OPERATE

● Preset radio broadcast frequencies

This unit is used to preset as many as 16 radio broadcast frequencies: FM/AM random presetting. After broadcast frequencies have been preset as described below, any desired station can be quickly and easily selected by simply touching one button.

■ Memory presetting

There are two types of memory presetting: automatic and manual. Select whichever is preferred.

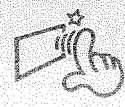
1. **Automatic presetting:**
   Beginning at the frequency indicated by the digital display, the FM broadcasting stations and AM broadcasting stations will be automatically preset to "channels" 1 through 8 for FM and 9 through 16 for AM, respectively.

   Note that in mountainous or remote areas, broadcasting stations which have weak broadcasting signals cannot be automatically preset into the memory.

2. **Manual presetting:**
   Stations can be freely preset to any desired channel.

Before memory presetting

Each button is used to preset two stations.

Front channels	Back channels
Presetting front channels (CH 1~8)	Presetting back channels (CH 9~16)
 Press momentarily.	Press slightly longer.

● Automatic memory presetting

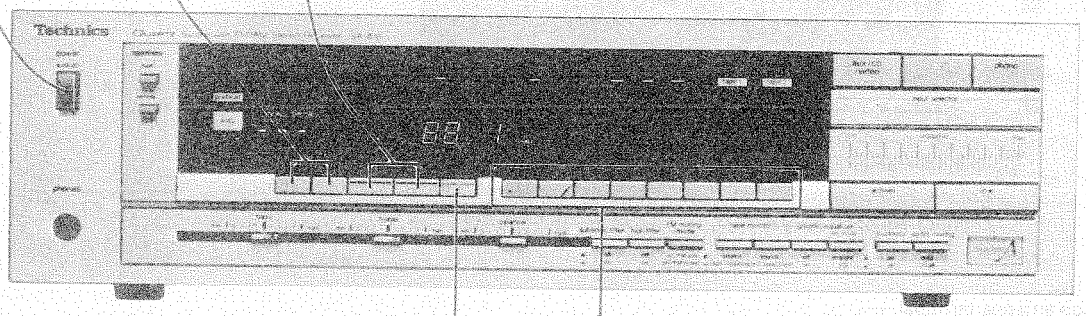
1 Power: "on" (■ → ■)

2 • To preset an FM station: press the "FM" button.
• To preset an AM station: press the "AM" button.

3 • To preset FM broadcasting stations: Set to 87.9 MHz.
• To preset AM broadcasting stations: Set to 530 kHz.

① Press the button and hold slightly. ② Release it at 87.9 MHz for FM or 530 kHz for AM, and then press the button again momentarily. ③ Press the button momentarily (frequency will change each time the button is pressed), and tune to one of the above frequencies.

(frequency will change continuously) (frequency change will stop)



4 Press. When the frequency indication begins to change, release.

(The frequency will change upward, and the automatic presetting will begin with the broadcasting station of the lowest frequency and will continue in order.)

5 Confirm the names (call signs, etc.) of the broadcasting stations which are preset to each channel, and enter them on the file sheet.

To check the front channels (CH 1~8):

Press momentarily. → Channel number is displayed. → Frequency stored in the memory is displayed.

To check the back channels (CH 9~16):

Press slightly longer. → Release the button when the channel number is displayed. → Frequency stored in the memory is displayed.

Notes:

1. In areas where there are less than 8 FM stations, the remaining channels (through channel 8) will be left empty. The empty channels can be filled by using manual memory presetting.
2. If a new broadcasting station is preset into a channel, the broadcasting station which was previously entered in that channel will be automatically erased.

• Manual memory presetting

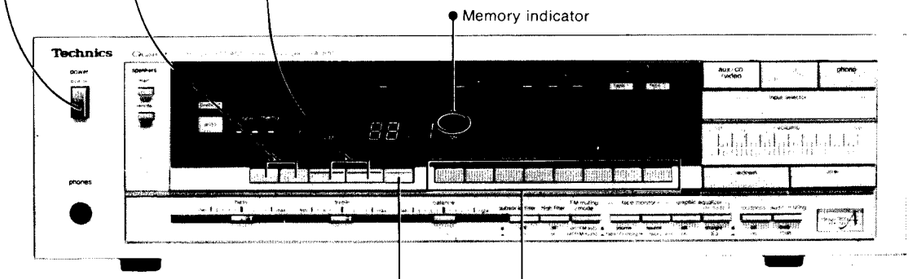
1 Power: "on" (⏻→●)

2 To preset an FM station: press the "FM" button.
To preset an AM station: press the "AM" button.

3 Press the appropriate tuning button to tune to the desired broadcast.

- **Auto tuning**
  Press the button. When the frequency indication begins to change, release the button (a broadcasting station will be selected automatically). Repeat this operation until the desired station is found.

- **Manual tuning**
  Press the button momentarily the desired station.
  The frequency will change each time the button is pressed.



4 Press momentarily, and then release.

(The memory indicator will illuminate for approximately 4 seconds.)

Note:
If the button is pressed continuously, the frequency will begin to change, and the memory will be preset automatically.
In order to stop the memory presetting, once again press either the "up" button or the "down" button.

6 Enter the name (call sign, etc.) of the preset broadcasting station on the station memory file sheet.

5 While the memory indicator is illuminated, press the button of the desired channel.

- **To preset channels 1 through 8:**

Press the button momentarily, and then release.

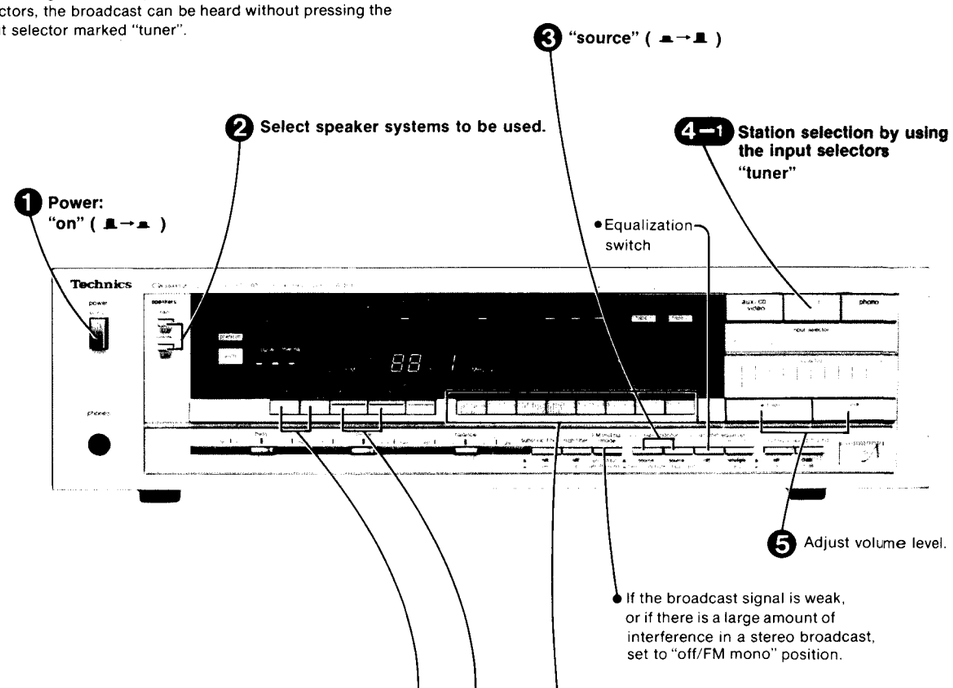
- **To preset channels 9 through 16:**

Press the button slightly longer, and then release.

Note:
1. If the memory indication illumination stops before you press the button, once again repeat step (4) and then step (5).
2. If a new broadcasting station is preset into a channel, the broadcasting station which was previously entered in that channel will be automatically erased.

• To listen to radio broadcasts

By pressing one of the preset-tuning buttons or the band selectors, the broadcast can be heard without pressing the input selector marked "tuner".


3 "source" (● → ⏻)
2 Select speaker systems to be used.
4–1 Station selection by using the input selectors "tuner"
1 Power: "on" (⏻ → ●)
• Equalization switch
Technics
5 Adjust volume level.
• If the broadcast signal is weak, or if there is a large amount of interference in a stereo broadcast, set to "off/FM mono" position.

4–3

Station selection by using the tuning buttons

1. Press either "FM" or "AM".
2. Press the left button to change the frequency downward, and press the right button to change the frequency upward.

- **Auto tuning** Press the button. When the frequency indication begins to change, release the button (a broadcasting station will be selected automatically). Repeat this operation until the desired station is found.

- **Manual tuning** Press the button momentarily and tune to the desired station. The frequency will change each time the button is pressed.

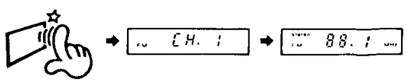
4–2

Station selection by using preset tuning buttons

By pressing one of these buttons, the broadcast can be heard.

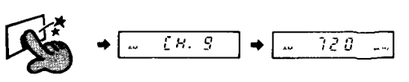
- **To select the front channels (CH 1~8):**

Press momentarily.	Channel number is displayed.	Frequency stored in the memory is displayed.



- **To select the back channels (CH 9~16):**

Press slightly longer	Release the button when the channel number is displayed.	Frequency stored in the memory is displayed.

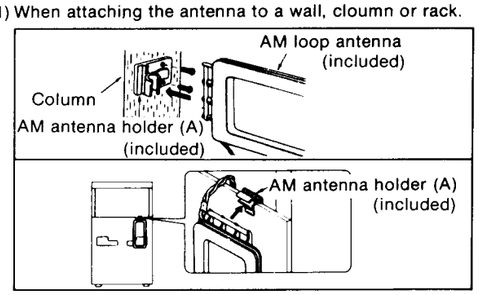


■ HOW TO USE THE AM LOOP ANTENNA

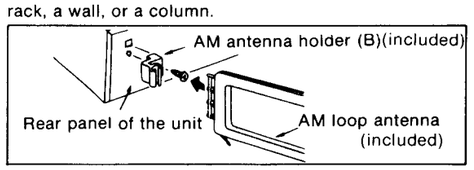
■ Installation of the AM loop antenna

Pay attention to the following points when attaching the antenna.
1) Do not attach it horizontally (to do so would impair reception).
2) Do not attach it close to metal surfaces (to do so would result in noise).
3) Do not attach it close to power cords, speaker wires, etc. (to do so would result in noise).
4) Do not attach it close to a tape deck (when the tape deck is being used, chirping or beeping sounds may be received).

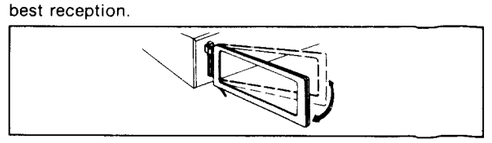
1. Connect the AM loop antenna to the AM antenna terminals located on the rear panel of the unit.
2. Find the height and direction of the antenna where reception is best and then fix it vertically to the wall, rack, etc.
   1) When attaching the antenna to a wall, cloumn or rack.



   2) When attaching the antenna to the unit.
   This type of installation may cause impaired reception or result in signal noise. If possible, attach the antenna to the rack, a wall, or a column.



3. Move the antenna toward the right or left to find the point of best reception.



■ PROTECTION CIRCUITRY

The protection circuitry may have operated if either of the following conditions is noticed:

- No sound is heard when the power is turned on.
- Sound stops during a performance.

The function of this circuitry is to prevent circuitry damage if, for example, the positive and negative speaker connection wires are "shorted", or if speaker systems with an impedance less than the indicated rated impedance of this unit are used.

If this occurs, follow the procedure outlines below:

1. Turn off the power.
2. Determine the cause of the problem and correct it.
3. Turn on the power once again after one minute.

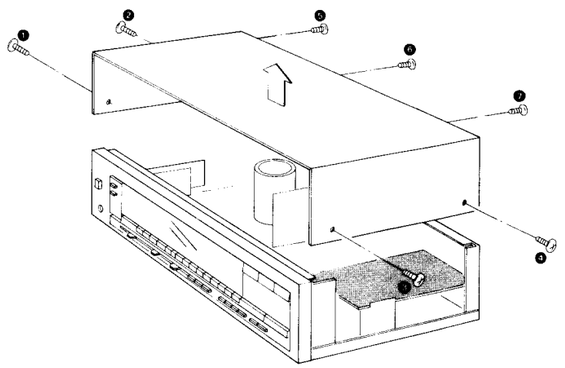
Note

When the protection circuitry functions, the unit will not operate unless the power is first turned off and then on again.

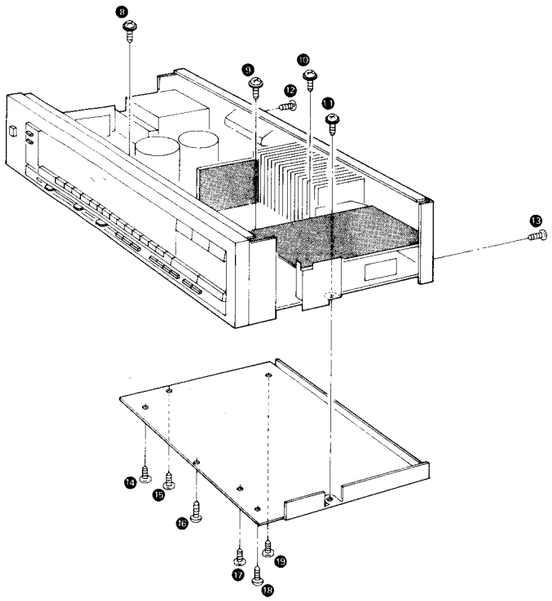
■ DISASSEMBLY INSTRUCTIONS

- **How to remove the cabinet**

1. Remove the 4 setscrews (Fig. 1 : ❶ ~ ❹) on the right and left sides of the cabinet, and the 3 setscrews (Fig. 1 : ❺ ~ ❼) on the back.
2. Remove the cabinet by lifting it in the direction of the arrow.



[Fig. 1]



[Fig. 2]

■ BEFORE REPAIR AND ADJUSTMENT

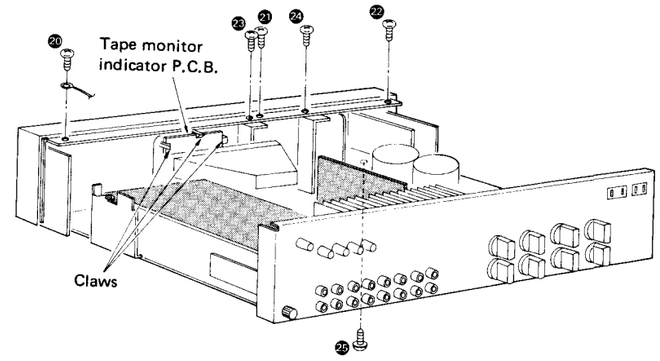
1. Turn off the power supply and short-circuit both ends of the power supply capacitors (C808, C809 63V 12000μF) with a resistor (about 10Ω, 5W) to discharge the charged voltage.
   Do not short both ends of C808 and C809 with a screwdriver. It may damage the component.
2. Before turning on the power supply after completion of repair, slowly apply the primary voltage by using a power supply voltage controller to make sure that the consumed current at 120V, 60Hz in no-signal mode is 150 ~ 500 mA.

- **How to remove the bottom board**

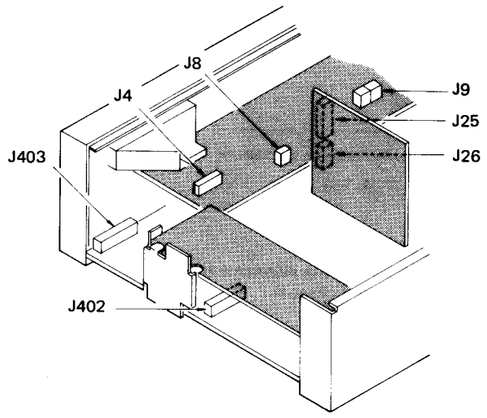
1. Remove the cabinet. (Refer to "**How to remove the cabinet**".)
2. Remove the 3 setscrews (Fig. 2 : ❽ ~ ❿) of the main P.C.B.
3. Remove the setscrew (Fig. 2 : ⓫) of the tuner P.C.B. fixture.
4. Remove the 2 setscrews (Fig. 2 : ⓬, ⓭) of the bottom board, arrow-marked (➡) on the rear chassis.
5. Remove the 6 setscrews (Fig. 2 : ⓮ ~ ⓳) of the bottom board.

- **How to remove the front panel**

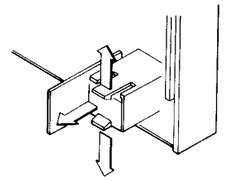
1. Remove the cabinet and bottom board. (Refer to "**How to remove the cabinet and bottom board**".)
2. Remove the 3 setscrews (Fig. 3 : ⓴ ~ ㉒) of the front panel top and the 2 setscrews (Fig. 3 : ㉓, ㉔) of the FL clamp.
3. Remove the setscrew (Fig. 3 : ㉕) of the front panel bottom.
4. Remove the tape monitor indicator P.C.B. from the 3 claws. (Fig. 3.)
5. Remove the 6 connectors (Fig. 4 : J8, J9, J25, J26, J402, J403.)
6. Release the claws as shown from inside the front panel to remove headphone jack. (Fig. 5)



[Fig. 3]



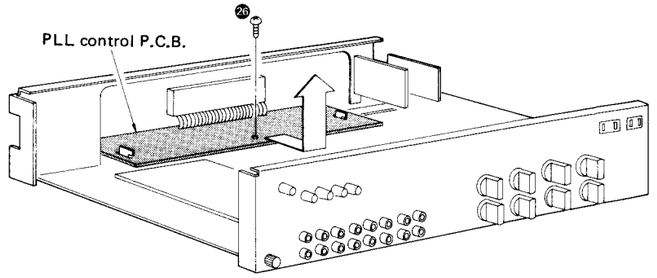
[Fig. 4]



[Fig. 5]

- **How to remove the PLL control P.C.B.**

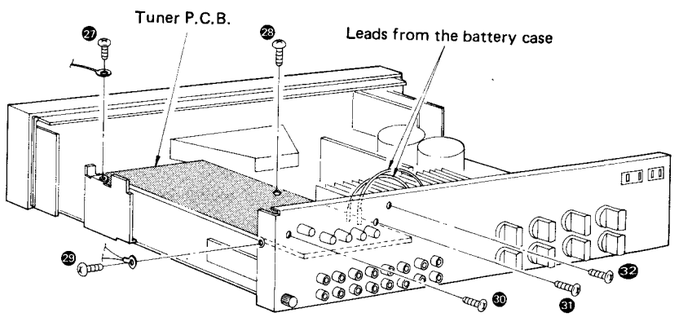
1. Remove the cabinet and front panel. (Refer to "**How to remove the cabinet and front panel**".)
2. Remove the setscrew (Fig. 6 : ㉖) of PLL control of P.C.B.
3. Remove the PLL control P.C.B. from the chassis in the direction of the arrow as shown.



[Fig. 6]

- **How to remove the tuner P.C.B.**

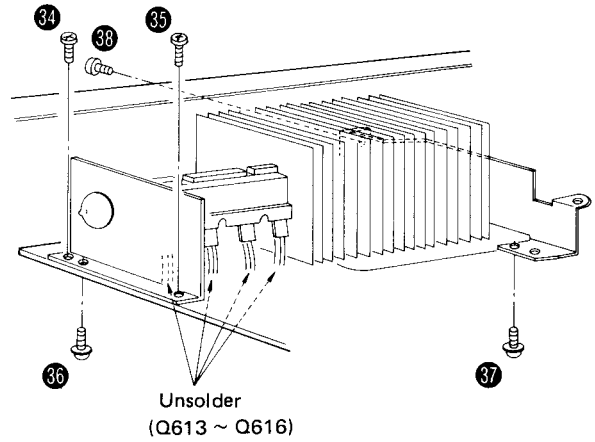
1. Remove the cabinet. (Refer to "**How to remove the cabinet**".)
2. Remove the 2 setscrews (Fig. 7 : ㉗, ㉘) of P.C.B. and the earth lug setscrew (Fig. 7 : ㉙).
3. Remove the 3 setscrews (Fig. 7 : ㉚ ~ ㉜) of antenna terminal plate from the rear of main body.
4. Draw the 2 leads from the battery case out of the space between the radiator and rear panel, and remove the tuner P.C.B. (Fig. 7)



[Fig. 7]

• How to remove the heat-sink

1. Remove the cabinet and bottom board. (Refer to "**How to remove the cabinet and bottom board**".)
2. Remove the tuner P.C.B. (Refer to "**How to remove the tuer P.C.B.**".)
3. Remove the 2 setscrews (Fig. 8 : ㉞, ㉟) at the top and 2 setscrews (Fig. 8 : ㊱, ㊲ at the bottom of heat-sink fixture, and the setscrews) (Fig. 8 : ㊳) of rear panel, respectively from top, bottom and rear.
4. Unsolder the power transistors (**Q613 ~ Q616**) from under the P.C.B. and then remove the heat-sink.



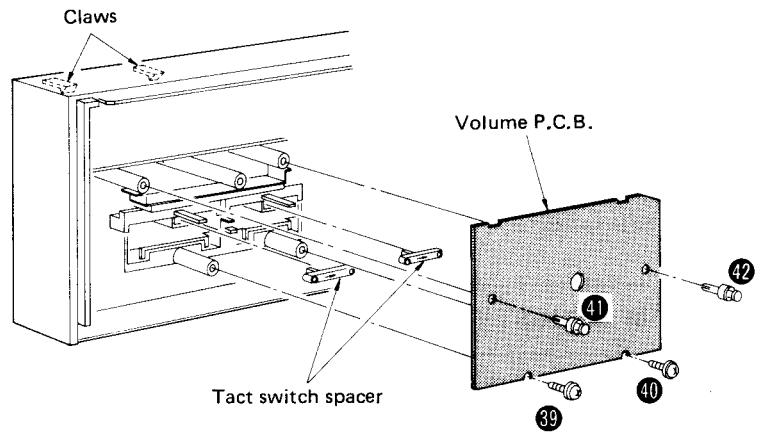
[**Fig. 8**]

• How to remove the volume P.C.B.

1. Remove the front panel. (Refer to "**How to remove the front panel**".)
2. Remove the 2 setscrews (Fig. 9 : ㊴, ㊵) and the 2 latches (Fig. 9 : ㊶, ㊷) of volume P.C.B.
3. Release the 2 claws to remove the volume P.C.B. (Fig. 9)

Note

When mounting the volume P.C.B. make sure that the tact switch spacer is in the switch button. Be sure to set it so that the arrow mark (➡) on the tact switch spacer is positioned as illustrated.

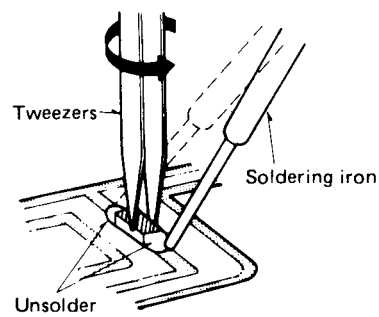


[**Fig. 9**]

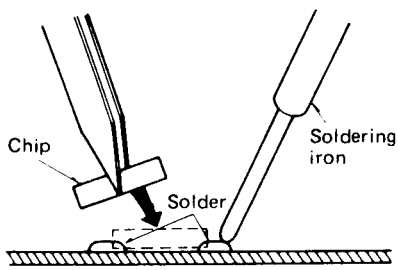
■ HOW TO REPLACE CHIPS (RESISTORS)

• How to replace chips (resistors)

1. Unsolder from chip by using solder sucker.
2. Remove chip with tweezers by rotating it while removing solder as shown in Fig. 10.
3. Solder circuit board first and then solder chip in the direction of the arrow as shown in Fig.11.



[**Fig. 10**]



[**Fig. 11**]

• Note for replacing chips

1. Do not heat chips more than three (3) seconds.
2. Be careful not to damage the electrode of chips.
3. Use soldering iron (less than 60W) and tweezers for replacing chips.

■ MEASUREMENTS AND ADJUSTMENTS

Note: AM IFT (T204) and AM OSC coil (L201) have been already adjusted, and require no adjustment.

AM ADJUSTMENT

*** Setting and Equipment used**

1. AC electronic voltmeter (VTVM).
2. AM signal generator (AM-SG).
3. Set Band selector to "AM" position.
4. Maintain line voltage at 120 volts.
5. Set speaker selector to "main : on" position.
6. Output of signal generator should be no higher than necessary to obtain an output reading.
7. Use a non-metal screwdriver for the adjustment.

Step No.	AM SIGNAL GENERATOR CONNECTION	AM SIGNAL GENERATOR FREQUENCY	DISPLAY FREQUENCY	PREPARATIONS	PARTS ADJUSTED	ADJUSTING PROCEDURE
	AM-IF ADJUSTMENT					
1	Connect AM-SG to AM antenna terminal through 200 pF capacitor. Common to chassis. (Powerful input) (Refer to Fig. 12)	450 kHz (30% Mod. with 400 Hz)	Frequency of non-interference	Connect AC VTVM or scope to "speaker" terminals.	T203 (AM IFT)	* Adjust the input frequency and adjustment points so that the output becomes maximum.
	AM-RF ADJUSTMENT					
2	Connect AM-SG to AM antenna terminal through 200pF capacitor. Common to chassis. (Weak input) (Refer to Fig. 12)	610 kHz (30% Mod. with 400 Hz)	610 kHz	Connect AC VTVM or scope to "speaker" terminals.	L202 (ANT Coil)	1. Adjust for maximum output. 2. Adjust core of L202 by screwdriver.
3		1500 kHz (30% Mod. with 400 Hz)	1500 kHz	Connect AC VTVM or scope to "speaker" terminals.	CT201 (ANT Trimmer)	1. Adjust for maximum output 2. Repeat steps (2) and (3) until the frequency correctly matches the frequency display.

FM ADJUSTMENT

*** Setting and Equipment used**

1. FM signal generator (FM-SG).
2. Distortion analyser.
3. Oscilloscope.
4. DC electronic voltmeter (VTVM).
5. Frequency counter (19 kHz and 108 MHz measurable).
6. Set band selector to "FM" position.
7. Set FM muting/FM mode selector to off/FM mono" position.
8. Other setting are the same as in AM adjustment.

*** Preparation of FM signal generator (FM-SG)**

1. The standard input of the set is 60 dB (1 mV), 400 Hz, 100% modulation (Because of attenuation, using coaxial cables. SG output must be 6 dB plus. That is, when input 60 dB, SG output is to be 66 dB.)

Step No.	FM SIGNAL GENERATOR CONNECTION	FM SIGNAL GENERATOR FREQUENCY	DISPLAY FREQUENCY	PREPARATIONS	PARTS ADJUSTED	ADJUSTING PROCEDURE
	FM MONO DISTORTION ADJUSTMENT					
4	Connect FM-SG to FM antenna terminal referring to Fig. 13. (Apply 60 dB to antenna terminal)	100.1 MHz (100% Mod. with 400 Hz)	100.1 MHz	Connect DC VTVM to between **TP202** and **TP203** through choke coil. (Refer to Fig. 13)	T201 (Discri. IFT)	1. Adjust T201 core so that voltage measured in signal mode is 0 mV (±50mV) in 300mV range. 2. Adjust T202 core so that distortion of right and left channels are minimized.
5		100.1 MHz (100% Mod. with 400 Hz)	100.1 MHz	Connect distortion analyser to "speaker" terminal of the set.	T202 (Discri. IFT)	

FM MPX V.C.O. ADJUSTMENT

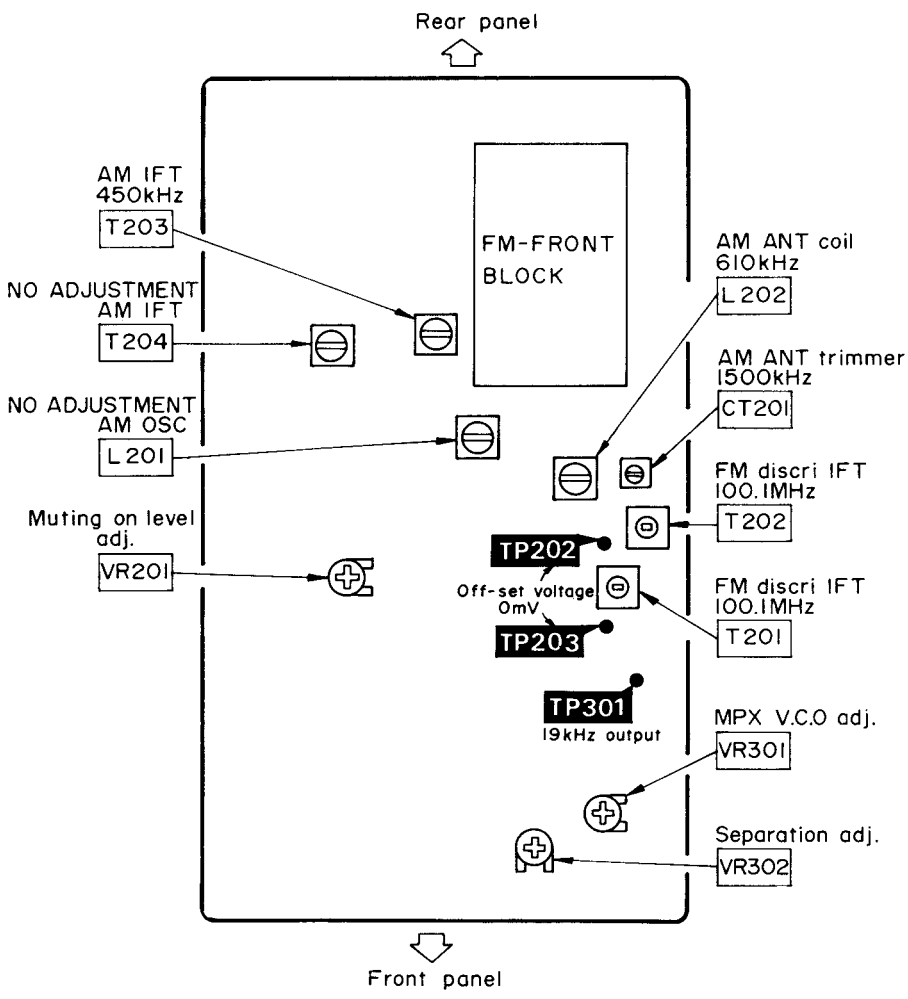
Step No.	USING A FREQUENCY COUNTER	USING ALTERNATE SYSTEM
6	1. 100 MHz, 60 dB Non-modulated mono signal applied to set. 2. Set FM muting/FM mode selector to "on/FM auto" position. 3. Connect frequency counter to **TP301** through resistor (100kΩ) referring to Fig. 14. 4. Adjust **VR301** to 19 kHz ± 30 Hz.	1. Apply stereo signal from generator or stereo station to tuner. 2. Adjust **VR301** until stereo indicator lights up. Cement arm of **VR301** as shown in Fig. 15.

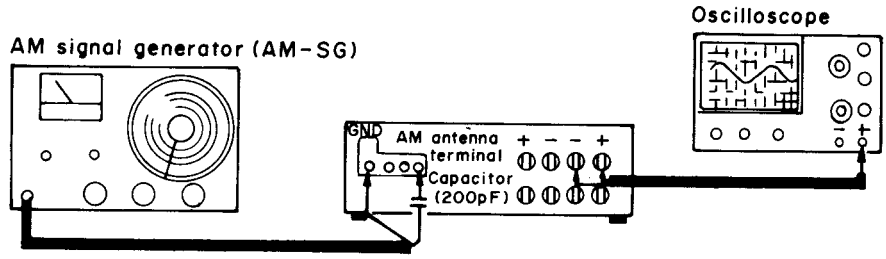
MUTING ON LEVEL ADJUSTMENT

Step No.						
7	Connect FM-SG to FM antenna terminal referring to Fig. 16. (Apply 16 dB to antenna terminal.)	100.1 MHz (100% Mod. with 1 kHz)	100.1 MHz	Connect Oscilloscope to "speaker" terminals.	VR201 (Muting on level)	1. Set FM muting/FM mode selector to "on/FM auto" position. 2. Adjust VR201 so that signal output is delivered. (Check to see that delivery of output is discontinued with input level lowered by 1 ~ 2 dB.)

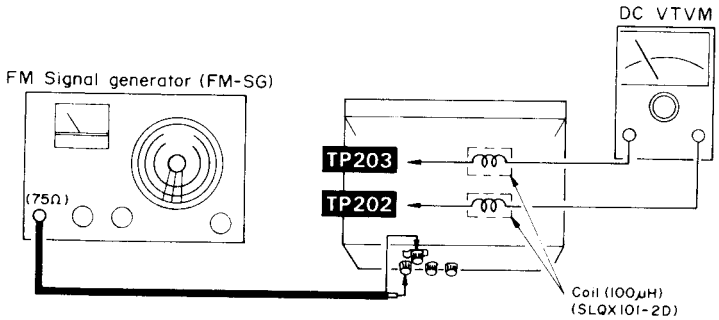
Step No.	FM SIGNAL GENERATOR CONNECTION	FM SIGNAL GENERATOR FREQUENCY	DISPLAY FREQUENCY	PREPARATIONS	PARTS ADJUSTED	ADJUSTING PROCEDURE
	SEPARATION ADJUSTMENT					
8	Connect FM-SG to FM antenna terminal. (Apply 60 dB to antenna terminal.) (Pilot 10% Mod. stereo signal.)	100.1 MHz (100% Mod. with 1 kHz) (L mode)	100.1 MHz	Connect AC VTVM to "OUTPUT" terminals of the set.	VR302 (Separation)	1. Set FM muting/FM mode selector to "on/FM auto" position. 2. Adjust VR302 so that R output is minimized when stereo modulator is in L (L ch. modulation) mode and that L output is minimized in R mode.
	FM ANALOG FREQUENCY METER ADJUSTMENT					
9	———	No-Signal	96.1 MHz	———	VR901 (Frequency meter)	1. Adjust VR901 so that the analog frequency meter indicates 96.1 MHz. (Refer to Fig. 17) 2. Next operate the tuning button so that 88.1 MHz and 107.9 MHz are indicated in the digital frequency display. Then make sure that the indicator is in contact with each letter. 3. If the requirement in step 2 is not satisfied, go back to step 1 and adjust the indicator within the dotted line of Fig. 17.

- **Adjustment points**

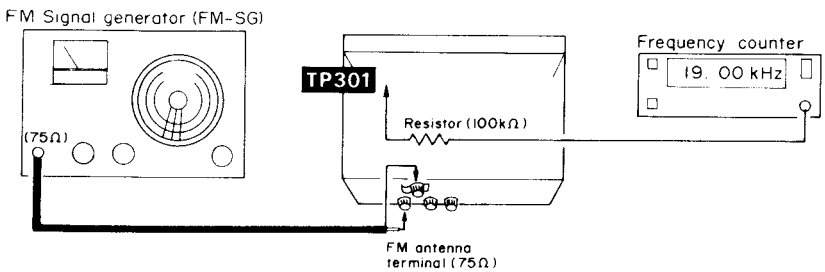




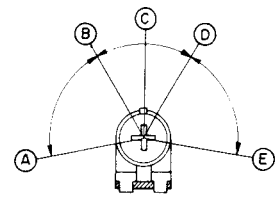
[Fig. 12] (Adjustment of AM)



[Fig. 13] (Adjustment of FM offset)



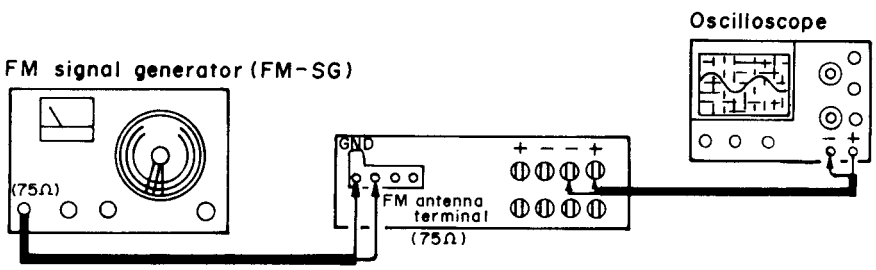
[Fig. 14] (Adjustment of FM MPX VCO)



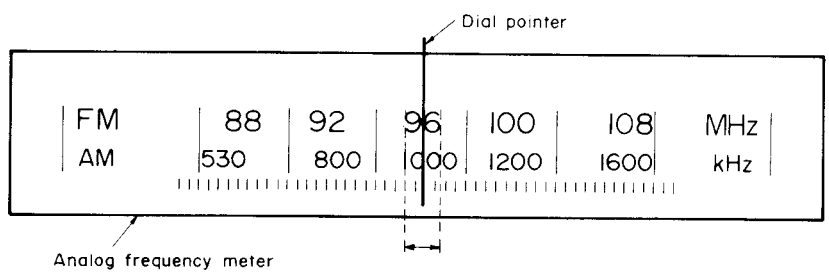
VR301

Ⓐ−Ⓑ,Ⓓ−Ⓔ : Stereo OFF position.
Ⓑ−Ⓓ : Stereo ON position. (indicator lighting)
Ⓒ : Adjust point of pilot circuit

[Fig. 15] (Adjustment of FM MPX VCO)



[Fig. 16] (Adjustment of muting on level)



[Fig. 17] (FM analog frequency meter)

AMPLIFIER ADJUSTMENT

1. Adjustment of Load Impedance Detection Circuit (after reparing the speaker impedance detection circuit.) [Refer to Fig. 18]

1. Set the main speaker selector to "on" and the remote speaker selector to "off", then make the volume level minimum.
2. Connect a load with 6.5Ω (1W) to the "Main : L ch and R ch" speaker terminal.
3. Connect **TP803** and ground (chassis) with lead wire.
4. Connect a DC voltmeter between **TP801** and ground (chassis) [L channel] or **TP802** and ground (chassis) [R channel].
5. Adjust VR802 (L channel) so that the voltage of **TP801** is 0 mV (−800 mV ~ 50 mV).
6. Adjust VR801 (R channel) so that the voltage of **TP802** is 0 mV (−800 mV ~ 50 mV).
7. Remove the lead wire which connects **TP803** and ground.

Checks

1. Set both main speaker selector and remote speaker selector to "off".
2. Connect a lead with 6.3Ω (1W) to the "Remote-L·R channel" speaker terminal.
3. Check that tap selector relay (RLY802) becomes "low tap" when remote speaker selector is set to "on".
   * "Low tap" is a state of tap with tap selector relay (RLY802) turned "on".

2. Checks of Protection Circuit After Repair and Adjustment.

- **Check of Overload Detection and Protection Circuit**
  [Overload Detection circuit]

1. Connect 4Ω (resistor or speaker) to main speaker terminal (L channel).
2. Main speaker selector is "on" position.
3. Apply output signal of about 5V at 1 kHz to Aux input terminal.
4. Make sure that no output is delivered when short-circuited with 5W, 0.33Ω resistor.
5. When power switch is turned "on" after turning it "off", then output should be delivered.
6. Similary check the R channel.

- **[DC Detection circuit]**

1. Main speaker selector is "on" position.
2. Apply ±15V DC to main speaker terminal. Then make sure that RLY801 turns off.
3. Set the main speaker selector to "off", and remote speaker selector to "on".
4. Connect 4Ω (Speaker) to remote speaker terminal (L channel).
5. Apply 5 Hz 300 mV signal to aux input terminal and volume level set at minimum, make sure that output is delivered.

3. Idling (ICQ) Adjustment (after repairing the main amp.)

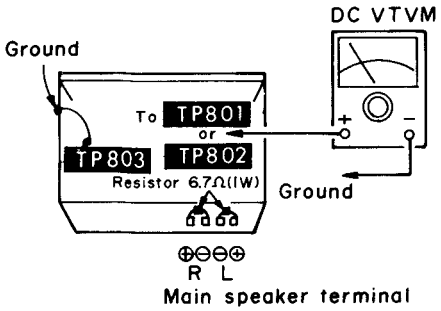
1. After the repair, set the volume level to minimum before turning on the power switch, and connect nothing to the speaker terminal.
2. Completely turn ICQ control (VR601, 602) counter-clockwise.
3. Connect the DC electronic voltmeter to **TP1** (+) and **TP2** (−) [L channel] or **TP3** (+) and **TP4** (−) [R channel]. [Refer to Fig. 19]
4. Make the adjustment as shown below 20 ~ 30 sec. after turning power switch "on".

———	TEST POINT	PARTS ADJUSTED	VALUE	———	TEST POINT	PARTS ADJUSTED	VALUE
L channel	**TP1** − **TP2** (Z601)	VR601	8 ~ 12 mV	R channel	**TP3** − **TP4** (Z602)	VR602	8 ~ 12 mV

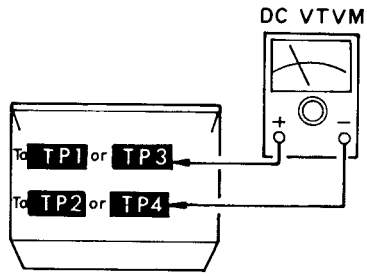
Note 1. Computer drive monitor indicator should indicate "auto".
2. Tap selector relay (RLY802) should be "high tap".
   * "High tap" is a state of tap with tap selector relay (RLY802) turned "off".

4. Clock Adjustment (after replacing the microcomputer) [Refer to Fig. 20]

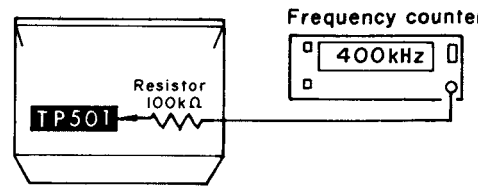
1. Connect the frequency counter to TP501 through 100 kΩ resistor.
2. Adjust the frequency to 400 ~ 430 kHz with VR501.



[Fig. 18]

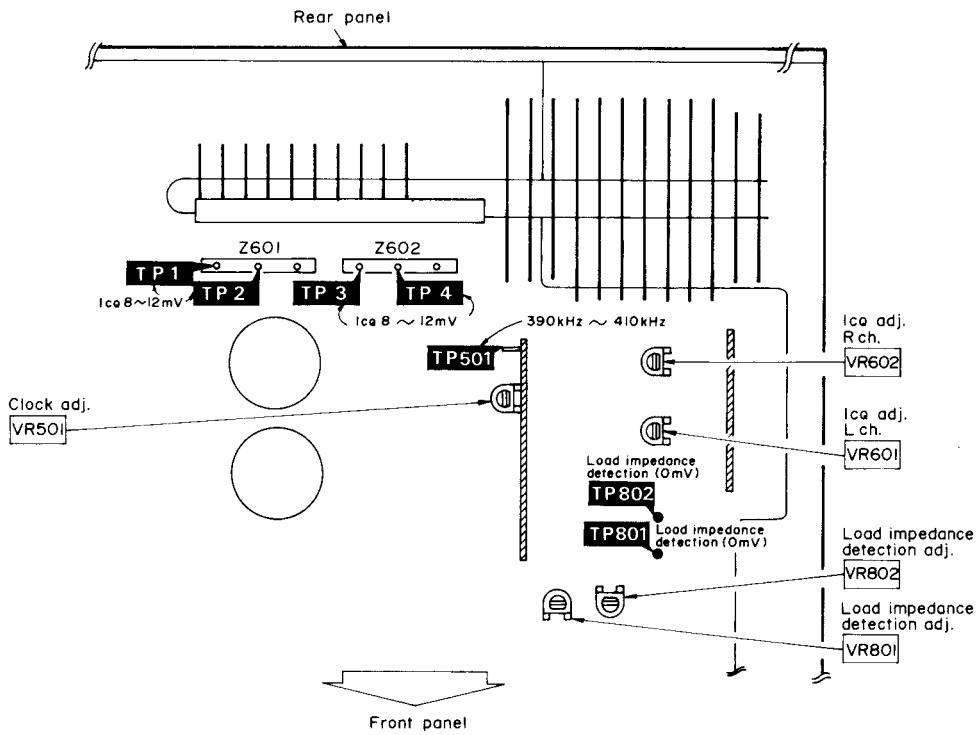


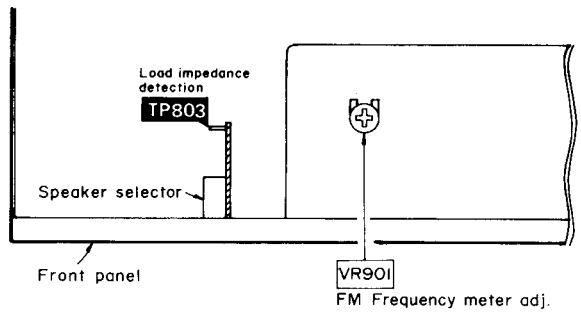
[Fig. 19]



[Fig. 20]

- **Adjustment points**





■ RESISTORS & CAPACITORS

Notes: 1. Part numbers are indicated on most mechanical parts. Please use this part number for parts orders.
2. Important safety notice: Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components use only manufacturer's specified parts.
3. The "Ⓢ" mark is service standard parts and may differ from production parts.
4. The unit of resistance is Ω(ohm), K = 1000Ω, M = 1000kΩ.
5. The unit of capacitance is μF (microfarad). P = 10^{-6} μF
6. Bracketed indications in Ref. No. columns specify the area. Parts without these indications can be used for all areas.

Numbering System of Resistor

Example

ERD	25	F	J	101
Type	Wattage	Shape	Tolerance	Value
ERG	2	AN	J	2R2
Type	Wattage	Shape	Tolerance	Value

Resistor Type	Wattage	Tolerance
ERD : Carbon	10 : 1/8W	J : ± 5%
ERG : Metal Oxide	12 : 1/2W	K : ± 10%
ERC : Solid	25 : 1/4W	
ERO : Metal film	1 : 1W	
	2 : 2W	
	S1 : 1/2W	

ERD10TLJ□□□ → Chip type carbon
ERO10MKG□□□ → Chip type metal film

Numbering System of Capacitor

Example

ECKD	1H	102	Z	F
Type	Voltage	Value	Tolerance	Peculiarity
ECEA	50	M	R47	R
Type	Voltage	Peculiarity	Value	Special use

Capacitor Type	Voltage		Tolerance
	ECEA Type	Order	
ECEA : Electrolytic	OJ : 6.3V	1H : 50V	C : ± 0.25pF
ECCD : Ceramic	1A : 10V	1C : 16V	J : ± 5%
ECKD : Ceramic	1C : 16V	KC : 400V AC	K : ± 10%
ECQM : Polyester	1E : 25V	1 : 100V	Z : +80%, –20%
ECQP : Polypropylene	1H : 50V		N : ± 30%
ECET : Electrolytic	1V : 35V		P : +100%, –0%
ECEA..... N: Non Polar Electrolytic	50 : 50V		
ECBT : Axial Leaded Type	25 : 25V		
Ceramic	2A : 100V		
	1J : 63V		

Ref. No.	Part No.	Value
RESISTORS		
R1,2	ERD10TLJ391U	390
R3,4	ERD10TLJ224U	220K
R5,6	ER010MKG5622	56.2K
R7,8	ERD10TLJ271U	270
R9,10	ERD10TLJ680U	68
R11,12	ERD10TLJ184U	180K
R13,14	ERD10TLJ123U	12K
R15,16	ERD10TLJ563U	56K
R17,18	ERD10TLJ102U	1K
R71,72	ERD10TLJ334U	330K
R73,74	ERD10TLJ102U	1K
R75,76	ERD10TLJ124U	120K
R77,78	ERD10TLJ103U	10K
R79,80	ERD10TLJ220U	22
R202 Ⓢ	ERD25FJ331	330
R203 Ⓢ	ERD25FJ561	560
R204 Ⓢ	ERD25FJ331	330
R205 Ⓢ	ERD25TJ824	820K
R206 Ⓢ	ERD25TJ273	27K
R207 Ⓢ	ERD25TJ153	15K
R208 Ⓢ	ERD25FJ103	10K
R209 Ⓢ	ERD25FJ182	1.8K
R210 Ⓢ	ERD25FJ682	6.8K
R211 Ⓢ	ERD25FJ181	180
R212,213 Ⓢ	ERD25TJ473	47K
R215 Ⓢ	ERD25FJ562	5.6K
R216 Ⓢ	ERD25FJ103	10K
R217 Ⓢ	ERD25FJ391	390
R218 Ⓢ	ERD25FJ272	2.7K
R219 Ⓢ	ERD25TJ123	12K
R220 Ⓢ	ERD25TJ223	22K
R221 Ⓢ	ERD25FJ821	820
R222 Ⓢ	ERD25TJ333	33K
R223 Ⓢ	ERD25TJ473	47K
R224 Ⓢ	ERD25FJ103	10K
R225 Ⓢ	ERD25TJ473	47K
R226 Ⓢ	ERD25FJ561	560
R227 Ⓢ	ERD25FJ821	820
R228 Ⓢ	ERD25FJ391	390
R229 Ⓢ	ERD25FJ181	180
R230 Ⓢ	ERD25FJ562	5.6K
R231 Ⓢ	ERD25FJ102	1K

Ref. No.	Part No.	Value
R232 Ⓢ	ERD25TJ104	100K
R233 Ⓢ	ERD25FJ821	820
R234 Ⓢ	ERD25TJ333	33K
R235 Ⓢ	ERD25FJ103	10K
R236 Ⓢ	ERD25TJ223	22K
R237 Ⓢ	ERD25FJ822	8.2K
R238 Ⓢ	ERD25FJ102	1K
R239 Ⓢ	ERD25TJ104	100K
R240 Ⓢ	ERD25TJ473	47K
R241 Ⓢ	ERD25FJ103	10K
R242 Ⓢ	ERD25TJ273	27K
R243 Ⓢ	ERD25TJ473	47K
R244 Ⓢ	ERD25TJ563	56K
R245 Ⓢ	ERD25FJ103	10K
R246 Ⓢ	ERD25TJ333	33K
R247 Ⓢ	ERD25FJ472	4.7K
R248 Ⓢ	ERD25FJ391	390
R249 Ⓢ	ERD25FJ472	4.7K
R250 Ⓢ	ERD25FJ221	220
R290 ⚠	ERDS1FJ823	82K
R291 Ⓢ	ERD25TJ683	68K
R299 Ⓢ	ERD25FJ391	390
R301 Ⓢ	ERD25FJ151	150
R302,303 Ⓢ	ERD25TJ223	22K
R304 Ⓢ	ERD25TJ153	15K
R305 Ⓢ	ERD25FJ102	1K
R306,307 Ⓢ	ERD25FJ392	3.9K
R308,309 Ⓢ	ERD25TJ104	100K
R310,311 Ⓢ	ERD25TJ104	100K
R312 Ⓢ	ERD25FJ103	10K
R313,314 Ⓢ	ERD25TJ104	100K
R315 Ⓢ	ERD25FJ222	2.2K
R401,402 Ⓢ	ERD25FJ561	560
R403,404 Ⓢ	ERD25TJ224	220K
R405,406 Ⓢ	ERD25TJ224	220K
R407,408 Ⓢ	ERD25TJ124	120K
R409,410 Ⓢ	ERD25TJ153	15K
R411,412 Ⓢ	ERD25FJ152	1.5K
R415,416 Ⓢ	ERD25FJ103	10K
R417 Ⓢ	ERD25FJ332	3.3K
R418,419 Ⓢ	ERD25TJ153	15K
R420,421 Ⓢ	ERD25TJ153	15K
R422,423 Ⓢ	ERD25TJ153	15K
R424 Ⓢ	ERD25FJ471	470

Ref. No.	Part No.	Value
R425,426 Ⓢ	ERD25FJ561	560
R427 Ⓢ	ERD25TJ394	390K
R428 Ⓢ	ERD25TJ334	330K
R429 Ⓢ	ERD25FJ181	180
R430 Ⓢ	ERD25FJ103	10K
R431,432 Ⓢ	ERD25FJ562	5.6K
R433,434 Ⓢ	ERD25FJ562	5.6K
R435,436 Ⓢ	ERD25FJ102	1K
R437 Ⓢ	ERD25TJ224	220K
R438 Ⓢ	ERD25FJ103	10K
R440 Ⓢ	ERD25FJ561	560
R441 Ⓢ	ERD25TJ393	39K
R442 Ⓢ	ERD25FJ561	560
R443 Ⓢ	ERG1ANJ271	270
R444,445 Ⓢ	ERD25TJ224	220K
R446,447 Ⓢ	ERD25FJ101	100
R448 Ⓢ	ERD25FJ222	2.2K
R449 ⚠	ERDS1FJ681	680
R450,451 Ⓢ	ERD25TJ153	15K
R452 Ⓢ	ERD25TJ153	15K
R453,454 Ⓢ	ERD25FJ181	180
R455,456 Ⓢ	ERD25TJ274	270K
R457,458 Ⓢ	ERD25TJ274	270K
R470,471 (MC) only	ERD25FJ100	10
R498,499 Ⓢ	ERD25FJ681	680
R501,502 Ⓢ	ERD25FJ331	330
R503,504 Ⓢ	ERD25FJ272	2.7K
R505,506 Ⓢ	ERD25TJ154	150K
R507,508 Ⓢ	ERD25TJ223	22K
R509,510 Ⓢ	ERD25TJ333	33K
R511,512 Ⓢ	ERD25TJ183	18K
R513,514 Ⓢ	ERD25TJ123	12K
R517,518 Ⓢ	ERD25FJ103	10K
R519 Ⓢ	ERD25FJ103	10K
R524 Ⓢ	ERD25FJ153	15K
R525 Ⓢ	ERD25FJ153	15K
R526 Ⓢ	ERD25TJ223	22K
R527 Ⓢ	ERD25TJ183	18K
R528 Ⓢ	ERD25TJ223	22K
R529 Ⓢ	ERD25TJ183	18K
R536 Ⓢ	ERD25FJ472	4.7K
R540 Ⓢ	ERD25FJ472	4.7K
R543 Ⓢ	ERD25FJ222	2.2K

Ref. No.	Part No.	Value
R545 Ⓢ	ERD25TJ473	47K
R546 Ⓢ	ERD25FJ562	5.6K
R547 Ⓢ	ERD25FJ103	10K
R551 Ⓢ	ERD25FJ271	270
R552 ⚠	ERDS1FJ122	1.2K
R553 Ⓢ	ERD25TJ223	22K
R554 Ⓢ	ERD25FJ681	680
R555 Ⓢ	ERD25FJ562	5.6K
R556 Ⓢ	ERD25FJ560	56
R557 Ⓢ	ERD25FJ181	180
R558,559 Ⓢ	ERD25FJ151	150
R560,561 Ⓢ	ERD25FJ271	270
R562 Ⓢ	ERD25FJ271	270
R563 Ⓢ	ERD25FJ561	560
R564 Ⓢ	ERD25FJ820	82
R601,602 Ⓢ	ERD25TJ824	820K
R603,604 Ⓢ	ERD25TJ824	820K
R605,606 Ⓢ	ERD25TJ474	470K
R607,608 Ⓢ	ERD25TJ474	470K
R609,610 Ⓢ	ERD25FJ392	3.9K
R611,612 Ⓢ	ERD25FJ102	1K
R613,614 Ⓢ	ERD25TJ223	22K
R615,616 Ⓢ	ERD25FJ332	3.3K
R617,618 Ⓢ	ERD25TJ393	39K
R619,620 Ⓢ	ERD25TJ474	470K
R621,622 Ⓢ	ERD25FJ681	680
R623,624 Ⓢ	ERD25FJ103	10K
R625,626 Ⓢ	ERD25FJ471	470
R627,628 ⚠	ERDS1FJ6R8	6.8
R629,630 ⚠	ERDS1FJ332	3.3K
R631,632 ⚠	ERDS1FJ821	820
R633,634 ⚠	ERDS1FJ470	47
R635,636 ⚠	ERDS1FJ182	1.8K
R637,638 Ⓢ	ERD25TJ223	22K
R639,640 ⚠	ERDS1FJ331	330
R641,642 ⚠ Ⓢ	ERD25TJ184	180K
R643,644 ⚠ Ⓢ	ERD25TJ184	180K
R645,646 Ⓢ	ERG1ANJ100	10
R647,648 Ⓢ	ERG1ANJ100	10
R649,650 Ⓢ	ERD25FJ392	3.9K
R651,652 Ⓢ	ER025CKF1203	120K
R653,654 Ⓢ	ERD25FJ822	8.2K
R655,656 Ⓢ	ERD25TJ333	33K
R657,658 Ⓢ	ERG1ANJ331	330

Ref. No.	Part No.	Value
R659,660 ⚠	ERDS1FJ681	680
R661,662 ⚠	ERDS1FJ681	680
R663 Ⓢ	ERD25TJ473	47K
R664 ⚠	ERDS1FJ332	3.3K
R665 ⚠ Ⓢ	ERD25FJ680	68
R666 ⚠	ERDS1FJ470	47
R667,668 Ⓢ	ERD25FJ681	680
R671,672 Ⓢ	ERD25FJ272	2.7K
R801,802 Ⓢ	ERD25FJ332	3.3K
R803,804 Ⓢ	ERD25FJ470	47
R805,806 Ⓢ	ERD25FJ562	5.6K
R807,808 Ⓢ	ERD25TJ334	330K
R809,810 Ⓢ	ERD25FJ821	820
R811,812 Ⓢ	ERD25TJ824	820K
R813,814 Ⓢ	ERD25FJ682	6.8K
R815,816 Ⓢ	ERD25FJ682	6.8K
R817,818 Ⓢ	ERD25TJ223	22K
R819,820 Ⓢ	ERD25TJ223	22K
R821 Ⓢ	ERD25TJ223	22K
R822 Ⓢ	ERD25TJ823	82K

Ref. No.	Part No.	Value
R823,824 Ⓢ	ERD25TJ223	22K
R825 Ⓢ	ERD25TJ333	33K
R826,827 Ⓢ	ERD25TJ823	82K
R828 Ⓢ	ERD25TJ473	47K
R829 Ⓢ	ERD25TJ184	180K
R830(M) Ⓢ	ERD25TJ273	27K
R830(MC) Ⓢ	ERD25TJ123	12K
R831 ⚠ Ⓢ	ERD25TJ823	82K
R832 Ⓢ	ERD25TJ183	18K
R833 ⚠ Ⓢ	ERD25FJ562	5.6K
R834 Ⓢ	ERG1ANJ820	82
R836 Ⓢ	ERD25FJ272	2.7K
R837 Ⓢ	ERD25FJ222	2.2K
R838 Ⓢ	ERD25FJ272	2.7K
R839 Ⓢ	ERD25FJ222	2.2K
R840 Ⓢ	ERD25FJ102	1K
R841 ⚠ Ⓢ	ERG2ANJ220	22
R842 ⚠	ERDS1FJ272	2.7K
R843 Ⓢ	ERD25FJ182	1.8K
R844 ⚠	ERDS1FJ221	220

Ref. No.	Part No.	Value
R845 ⚠	ERDS1FJ101	100
R846 Ⓢ	ERD25FJ821	820
R847 Ⓢ	ERD25FJ102	1K
R848,849 ⚠	ERDS1FJ220	22
R850 Ⓢ	ERD25FJ272	2.7K
R851 ⚠ Ⓢ	ERG1ANJ271	270
R852 ⚠ Ⓢ	ERG2ANJ681	680
R853 Ⓢ	ERG2ANJ271	270
R854(M) Ⓢ	ERD25FJ473	47K
R854(MC)	ERD25TJ273	27K
R855	ERDS1FJ2R2	2.2
R856(MC) Ⓢ	ERG2ANJ681	680
R901 Ⓢ	ERD25FJ102	1K
R902 Ⓢ	ERD25FJ561	560
R903 Ⓢ	ERD25FJ682	6.8K
R904 Ⓢ	ERD25FJ103	10K
R905 Ⓢ	ERD25FJ101	100
R906 Ⓢ	ERD25FJ151	150
R907 Ⓢ	ERD25FJ103	10K
R908 Ⓢ	ERD25TJ273	27K

Ref. No.	Part No.	Value
R909 ⚠	ERDS1FJ680	68
R910 Ⓢ	ERD25FJ681	680
R911 Ⓢ	ERD25FJ103	10K
R912 Ⓢ	ERD25TJ224	220K
R913 Ⓢ	ERD25TJ154	150K
R914 Ⓢ	ERD25TJ104	100K
R920 Ⓢ	ERD25TJ824	820K
R921 Ⓢ	ERD25TJ473	47K
R922 Ⓢ	ERD25TJ333	33K
R923 Ⓢ	ERD25FJ151	150
R924 Ⓢ	ERD25TJ104	100K
R925 Ⓢ	ERD25TJ473	47K
R926 Ⓢ	ERD25TJ224	220K
R927 Ⓢ	ERD25FJ221	220
R928 Ⓢ	ERD25TJ223	22K
R929 Ⓢ	ERD25TJ684	680K
R1001 ⚠ Ⓢ	ERC12ZGK335	3.3M

Ref. No.	Part No.	Value
CAPACITORS		
C1,2 Ⓢ	ECEA50Z3R3	3.3
C3,4 Ⓢ	ECCD1H101K	100P
C5,6 Ⓢ	ECKD1H471KB	470P
C7,8 Ⓢ	ECQM1H223JZ	0.022
C9,10 Ⓢ	ECQM1H682JZ	0.0068
C11,12 ⚠	ECEA1HN010S	1
C13,14 Ⓢ	ECEA1CS330	33
C71,72 Ⓢ	ECEA50Z3R3	3.3
C73,74 Ⓢ	ECCD1H390K	39P
C75,76 Ⓢ	ECCD1H820K	82P
C77,78 Ⓢ	ECKD1H391KB	390P
C201	ECBT1C103ZYY	0.01
C202,203	ECBT1C223NYY	0.022
C205,206	ECBT1C223NYY	0.022
C207	ECBT1C223NYY	0.022
C208 Ⓢ	ECCD1H101K	100P
C210,211 Ⓢ	ECEA50Z1	1
C212 Ⓢ	ECEA25Z4R7	4.7
C213 Ⓢ	ECEA50Z1	1
C214,215	ECBT1C223NYY	0.022
C216 Ⓢ	ECEA1HS100	10
C217,218	ECBT1C223NYY	0.022
C219	ECBT1C223NYY	0.022
C220 Ⓢ	ECEA50ZR47	0.47
C222	ECBT1H102ZKY	0.001
C223 Ⓢ	ECCD1H150K	15P
C224 Ⓢ	ECQM1H473JZ	0.047
C225 Ⓢ	ECCD1H120KC	12P
C226	ECQP1471JZ	470P
C228 Ⓢ	ECEA1AS101	100
C229 Ⓢ	ECEA1CS330	33
C230 Ⓢ	ECEA1CS330	33
C231 Ⓢ	ECQM1H183JZ	0.018
C233	ECBT1C223NYY	0.022
C234,235	ECBT1C103ZYY	0.01
C237 Ⓢ	ECKD1H103ZF	0.01
C238 Ⓢ	ECEA50Z2R2	2.2
C298,299 Ⓢ	ECKD1H103ZF	0.01

Ref. No.	Part No.	Value
C301 Ⓢ	ECEA1CS221	220
C302,303 Ⓢ	ECQM1H223JZ	0.022
C304,305 Ⓢ	ECEA50ZR47	0.47
C306	ECQP1471JZ	470P
C307 Ⓢ	ECEA50Z1	1
C309 Ⓢ	ECQM1H473JZ	0.047
C310 Ⓢ	ECEA50ZR47	0.47
C311 Ⓢ	ECEA50Z3R3	3.3
C312 Ⓢ	ECEA50Z1	1
C313	ECBT1C103ZYY	0.01
C401,402 Ⓢ	ECEA25Z4R7	4.7
C405,406 Ⓢ	ECEA1ES470	47
C407,408 Ⓢ	ECCD1H330K	33P
C409,410 Ⓢ	ECQM1H104JZ	0.1
C411,412 Ⓢ	ECEA1HS100	10
C413 Ⓢ	ECEA1HS100	10
C414 Ⓢ	ECEA25Z4R7	4.7
C415 Ⓢ	ECEA1AS470	47
C417 Ⓢ	ECQM1H473JZ	0.047
C418 Ⓢ	ECEA50Z1	1
C419 Ⓢ	ECEA1AS331	330
C421 Ⓢ	ECKD1H473ZF	0.047
C422,423 Ⓢ	ECEA50Z3R3	3.3
C424 Ⓢ	ECKD1H473ZF	0.047
C425 Ⓢ	ECCD1H151K	150P
C426 Ⓢ	ECCD1H151K	150P
C427 Ⓢ	ECKD1H473ZF	0.047
C428 Ⓢ	ECEA25Z4R7	4.7
C429,430 Ⓢ	ECKD1H473ZF	0.047
C501,502 Ⓢ	ECEA50Z1	1
C503,504 Ⓢ	ECEA50Z3R3	3.3
C505 ⚠	ECEA1CN470S	47
C508 Ⓢ	ECCD1H151K	150P
C510 Ⓢ	ECEA50Z3R3	3.3
C511 Ⓢ	ECEA25Z4R7	4.7
C513 Ⓢ	ECEA50Z3R3	3.3
C521 Ⓢ	ECKD1H223ZF	0.022
C522 Ⓢ	ECEA1AS221	220

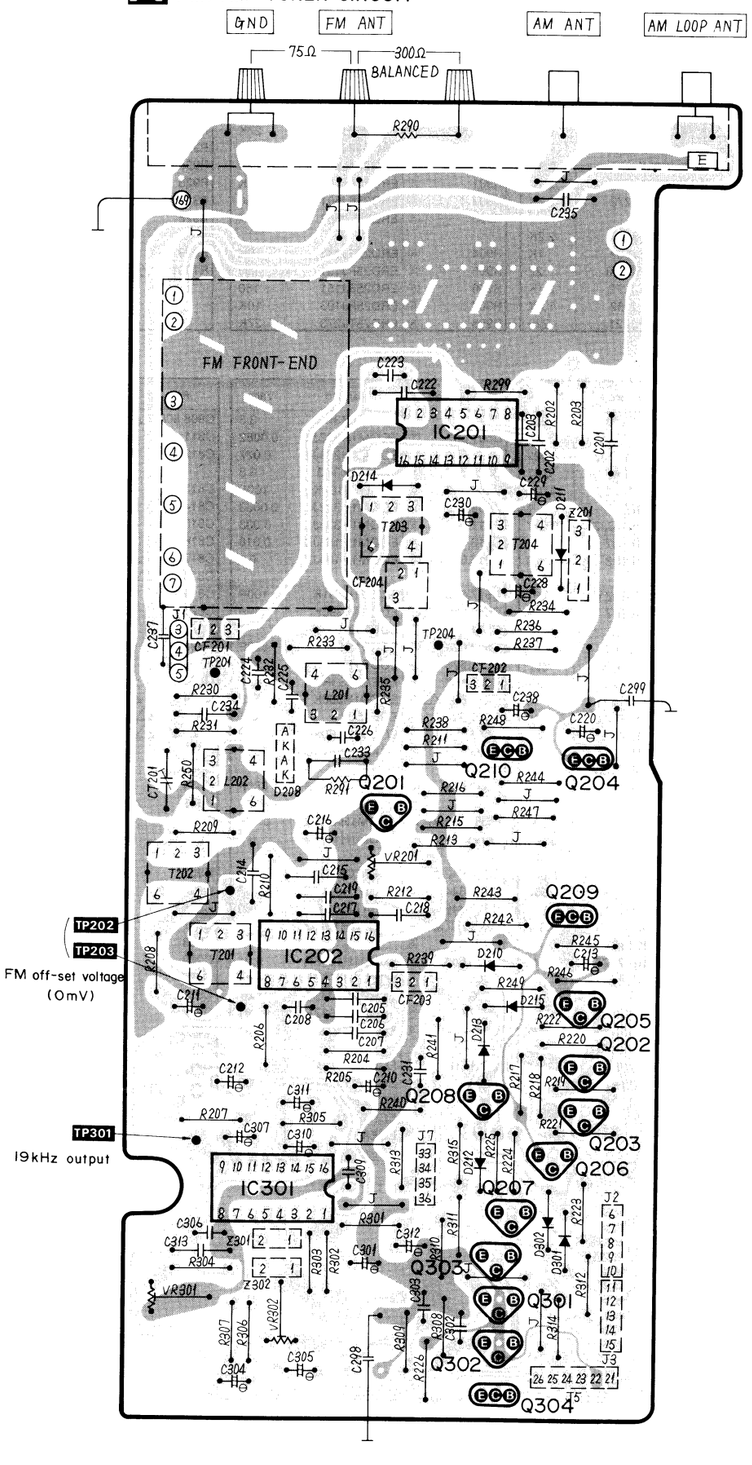
Ref. No.	Part No.	Value
C523 Ⓢ	ECEA50Z3R3	3.3
C601,602 Ⓢ	ECQM1H822JZ	0.0082
C603,604 Ⓢ	ECQM1H273JZ	0.027
C605,606 Ⓢ	ECEA50Z3R3	3.3
C607,608 Ⓢ	ECCD1H101K	100P
C609,610 Ⓢ	ECQM1H332JZ	0.0033
C611,612 Ⓢ	ECQM1H333JZ	0.033
C613,614 Ⓢ	ECQM1H183JZ	0.018
C615,616 Ⓢ	ECQM1H104JZ	0.1
C617,618 Ⓢ	ECCD1H101K	100P
C619,620 Ⓢ	ECCD1H390K	39P
C621,622 Ⓢ	ECEA50Z1	1
C623,624 Ⓢ	ECKD1H821KB	820P
C625,626 Ⓢ	ECCD1H270K	27P
C627,628 Ⓢ	ECEA2AS3R3	3.3
C629,630 ⚠ Ⓢ	ECCD1H560K	56P
C631,632 Ⓢ	ECEA50Z1	1
C633,634 ⚠ Ⓢ	ECCD1H560K	56P
C635,636 Ⓢ	ECKD1H681KB	680P
C637,638 Ⓢ	ECKD1H681KB	680P
C639,640(M) Ⓢ	ECQM1H473JZ	0.047
C639,640(MC) Ⓢ	ECQM1H104JZ	0.1
C641,642 Ⓢ	ECEA1CS330	33
C643,644 Ⓢ	ECCD1H030CC	3P
C645,646 Ⓢ	ECEA1JS101	100
C651,652(MC) Ⓢ	ECQM1H104JZ	0.1
C653,654 Ⓢ	ECKD1H103ZF	0.01
C655 Ⓢ	ECKD1H473ZF	0.047
C696 Ⓢ	ECKD1H103ZF	0.01
C697,698 Ⓢ	ECKD1H102ZF	0.001
C699 Ⓢ	ECKD1H103ZF	0.01
C801,802 Ⓢ	ECQM1H473JZ	0.047
C803 Ⓢ	ECQM1H683JZ	0.068
C804 Ⓢ	ECEA25Z4R7	4.7
C805 Ⓢ	ECKD1H103ZF	0.01
C806 Ⓢ	ECEA50Z1	1
C807 Ⓢ	ECEA50Z1	1

Ref. No.	Part No.	Value
C808,809 ⚠	ECET1JV123U	12000
C811 Ⓢ	ECEA1AS470	47
C812 Ⓢ	ECKD1H103ZF	0.01
C813 Ⓢ	ECEA1AS470	47
C814 Ⓢ	ECEA1HS470	47
C815 Ⓢ	ECKD1H103ZF	0.01
C816 Ⓢ	ECEA1VS101	100
C817 ⚠	ECEA1HU471	470
C818 ⚠ Ⓢ	ECEA1HS331	330
C819 Ⓢ	ECKD1H103ZF	0.01
C820 Ⓢ	ECEA1ES470	47
C821 Ⓢ	ECEA1ES101	100
C822 Ⓢ	ECKD1H103ZF	0.01
C823 Ⓢ	ECEA1AS470	47
C824 ⚠	ECEA1VU102	1000
C825 ⚠ Ⓢ	ECKD1H103PE	0.01
C830,831 ⚠ Ⓢ	ECKD1H103PE	0.01
C832	ECEA1HU471	470
C833 Ⓢ	ECKD1H103ZF	0.01
C834 Ⓢ	ECEA1ES470	47
C835 ⚠	ECEA1HNR47S	0.47
C901	ECBT1C103ZYY	0.01
C902 Ⓢ	ECEA25M4R7R	4.7
C903 Ⓢ	ECEA1HS100	10
C904,905	ECBT1C103ZYY	0.01
C906	ECEA0JU102	1000
C907 Ⓢ	ECCD1H070CC	7P
C908 Ⓢ	ECCD1H180KC	18P
C909	ECEA0JU102	1000
C910 Ⓢ	ECEA1HS470	47
C911 Ⓢ	ECEA1VS330	33
C912 Ⓢ	ECEA1HS100	10
C913 Ⓢ	ECEA1AS221	220
C914,915 Ⓢ	ECEA50Z1	1
C916 Ⓢ	ECEA50Z1	1
C1001 ⚠	ECKD1C103PF2	0.01

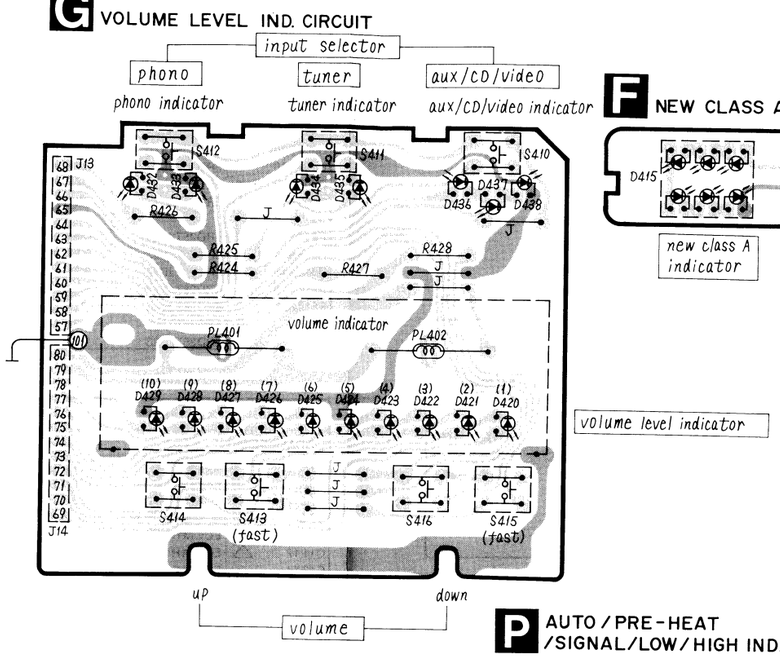
■ PRINTED CIRCUIT BOARDS

Ground (Earth) lines

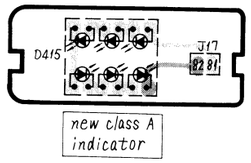
A FM/AM TUNER CIRCUIT



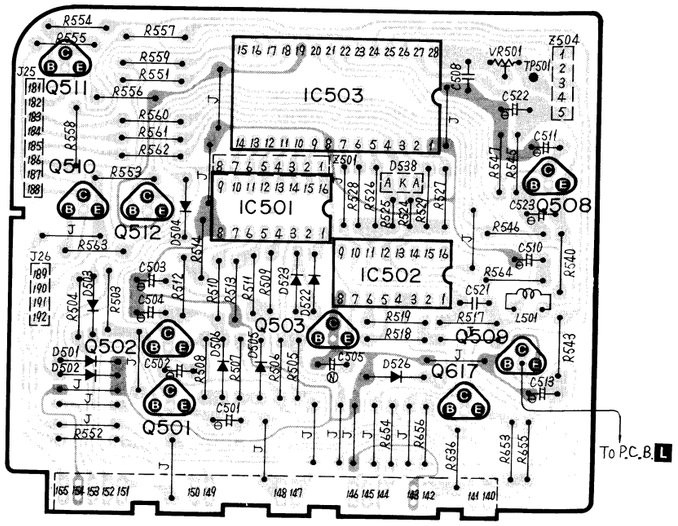
G VOLUME LEVEL IND. CIRCUIT



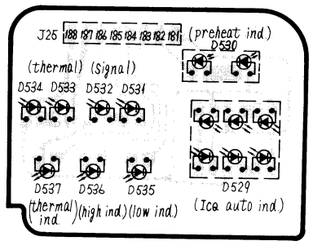
F NEW CLASS A IND.



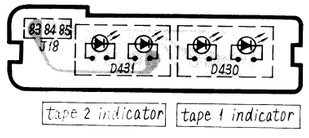
K ICQ CONTROLLER/RELAY DRIVE /OVER LOAD DET. CIRCUIT



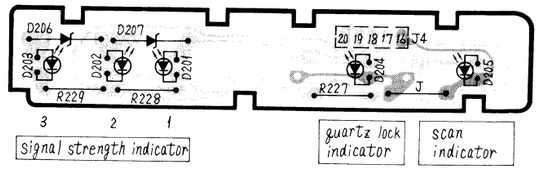
P AUTO/PRE-HEAT /SIGNAL/LOW/HIGH IND.



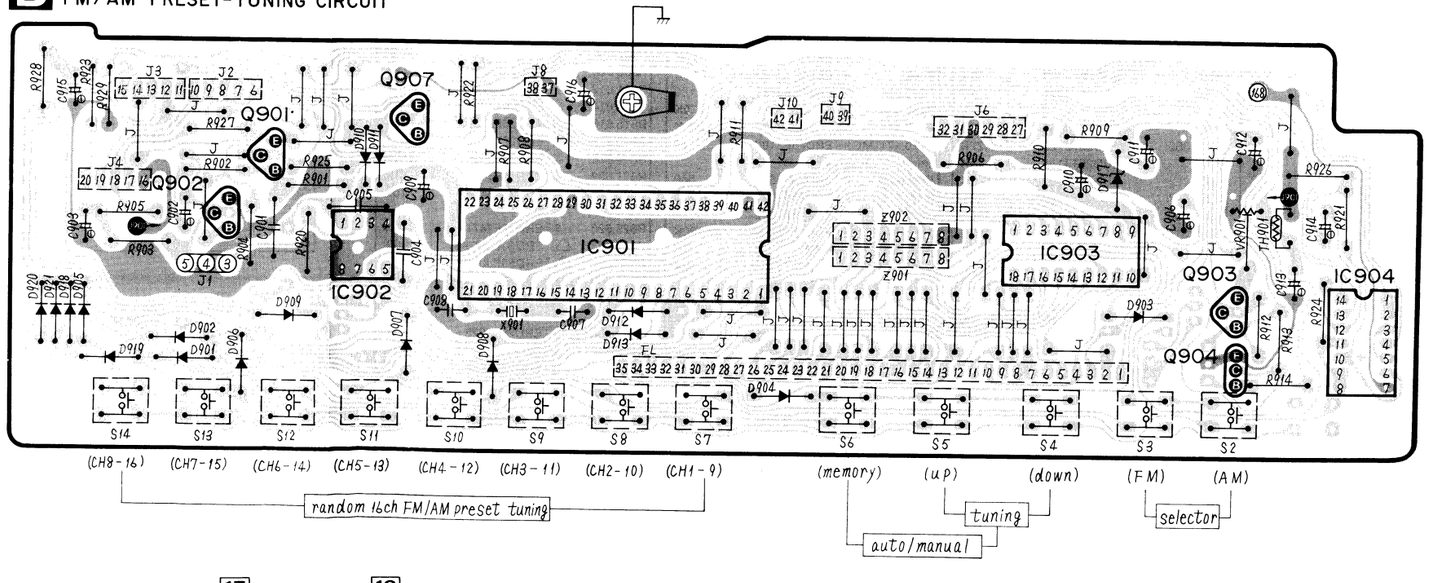
H TAPE-MONITOR IND.



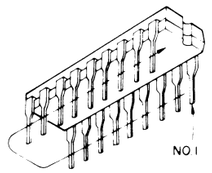
C AUTO SCAN/QUARTZ LOCK /SIGNAL STRENGTH IND.



B FM/AM PRESET-TUNING CIRCUIT



• Terminal guide of transistors, diodes and IC's

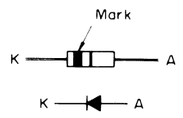


AN6558F	8pin
SVIUPB553C-E	
AN7062	18pin
MN6631	
MN6632	
AN6873N	
SVITD62501P	16pin
SVIUPC1018C	
SVIUPC1167C2	
SVIUPC1161C3	
SVITA7612AP	
MN1421STA	28pin
SVIUPD4011BC	14pin

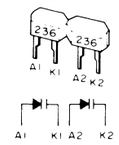
2SC3182

2SA1265

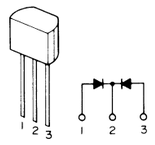
MA162A



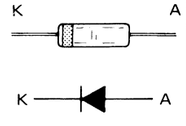
SVDKV1236Z



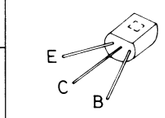
SVDMC921



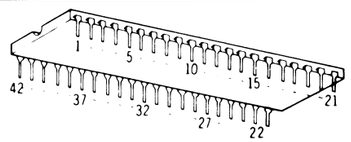
MA150, MA27WA



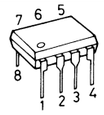
2SA1123, 2SC1685
2SA564A, 2SC2631
2SC1383NC, 2SC1684
2SA992, 2SC945
2SA684, 2SD1011
2SC1509, 2SC1845
2SA777



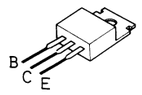
SVID1704C525



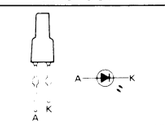
AN6552
SVINJ4559DSM
SVINJM2043DD



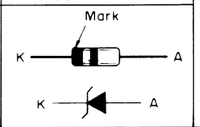
2SA1112
2SD762
2SC2592



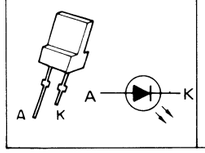
SVDAY5533K-M
LN846RP
LN346GP



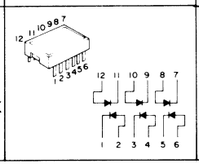
MA1062M, MA1270M
MA1160L, MA1180M
MA1030L



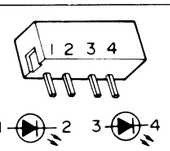
LN446YP



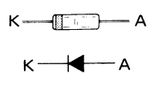
LN0603GP3G



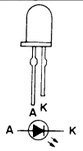
LN0202YP4



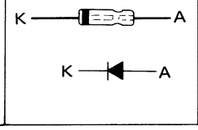
OA90



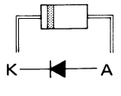
LN41YPHLMS



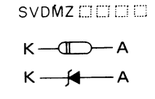
20A90



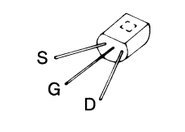
SVDSR1K2
SVDS3V20



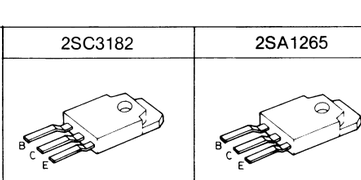
SVDMZ303B
SVDMZ309A
SVDMZ308B



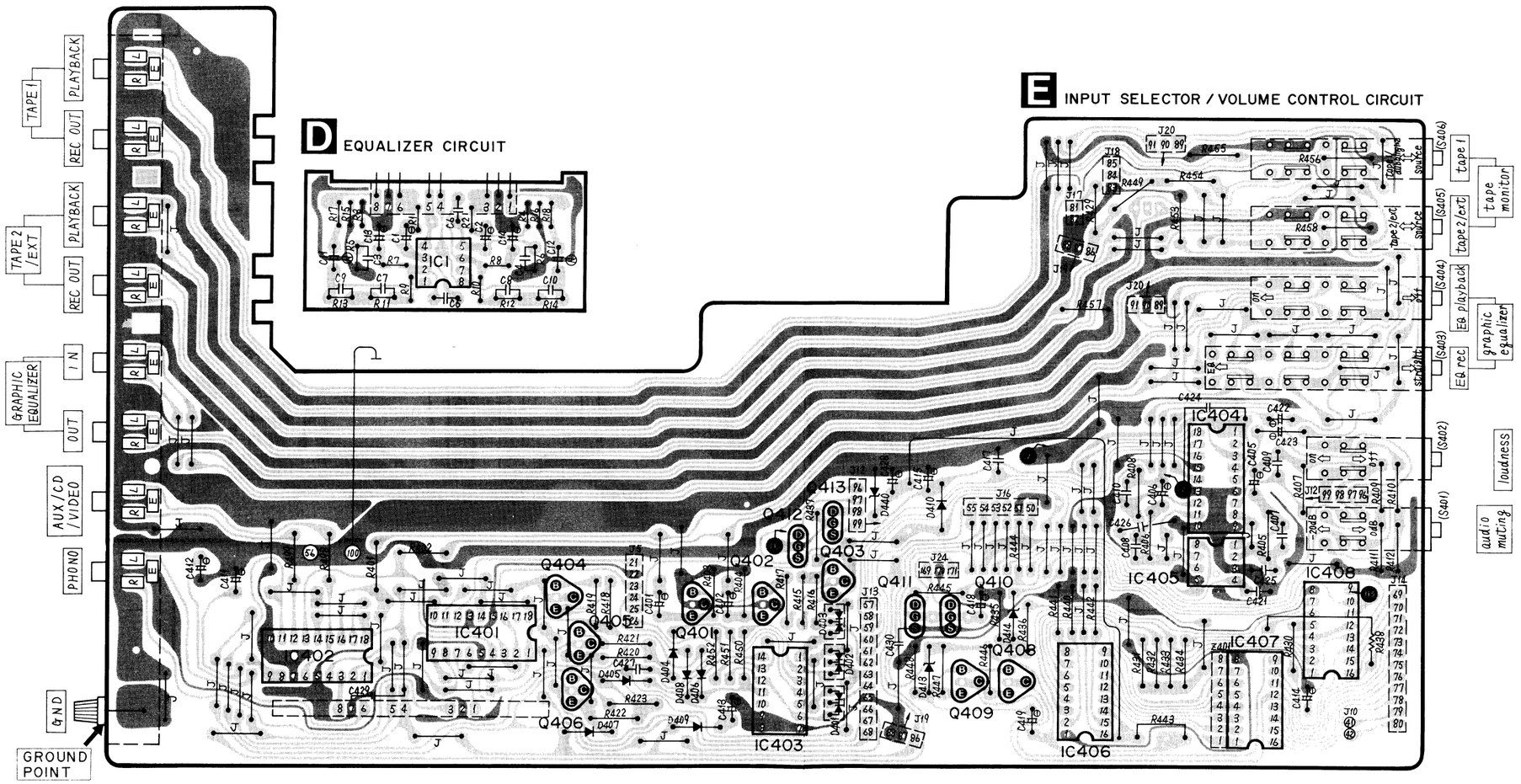
2SJ103, 2SJ104

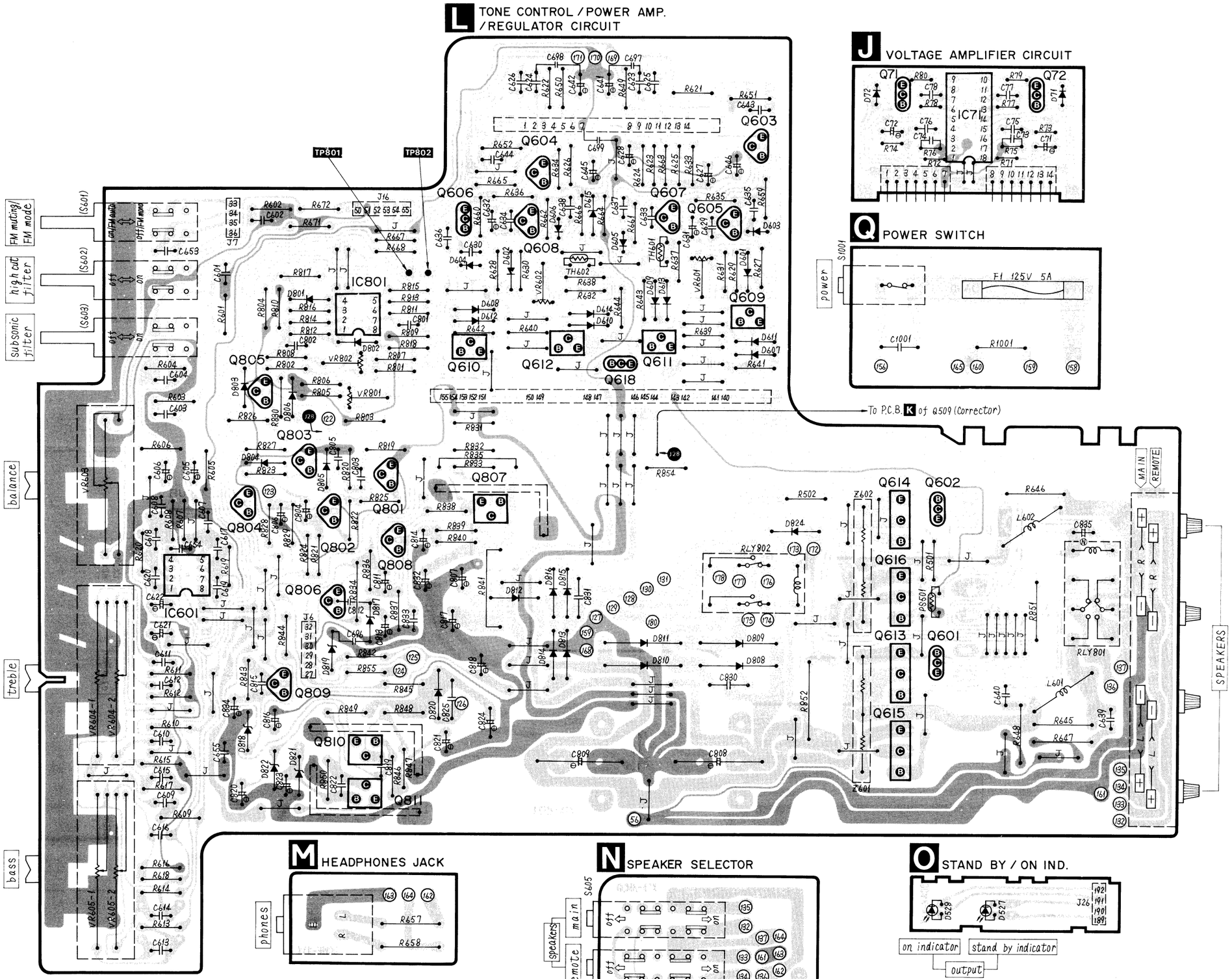


D EQUALIZER CIRCUIT

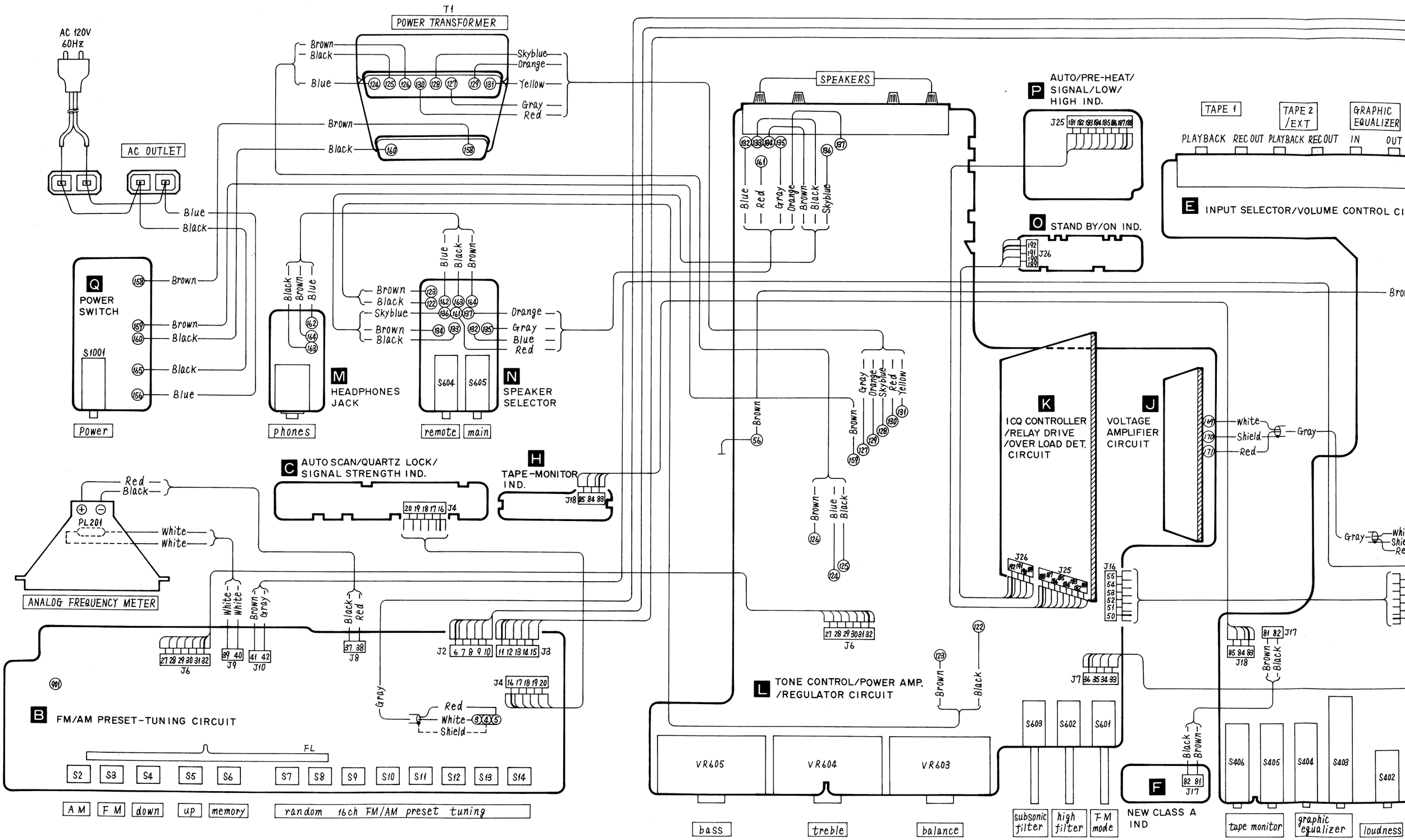


E INPUT SELECTOR / VOLUME CONTROL CIRCUIT




L TONE CONTROL / POWER AMP. / REGULATOR CIRCUIT
J VOLTAGE AMPLIFIER CIRCUIT
Q POWER SWITCH
M HEADPHONES JACK
N SPEAKER SELECTOR
O STAND BY / ON IND.
TP801
TP802
IC801
IC601
IC7
Q601
Q602
Q603
Q604
Q605
Q606
Q607
Q608
Q609
Q610
Q611
Q612
Q613
Q614
Q615
Q616
Q618
Q801
Q802
Q803
Q804
Q805
Q806
Q807
Q808
Q809
Q810
Q811
Q71
Q72
RLY801
RLY802
F1 125V 5A
To P.C.B. K of Q509 (Corrector)
FM muting/ FM mode
high cut filter
subsonic filter
balance
treble
bass
SPEAKERS
MAIN
REMOTE
phones
speakers
main
remote
on indicator
stand by indicator
output

■ CIRCUIT BOARDS AND WIRING CONNECTION DIAGRAM (Top View)



op View)

SPEAKERS

P AUTO/PRE-HEAT/ SIGNAL/LOW/ HIGH IND.

O STAND BY/ON IND.

E INPUT SELECTOR/VOLUME CONTROL CIRCUIT

TAPE 1 | TAPE 2 /EXT | GRAPHIC EQUALIZER | aux/CD /Video | PHONO | GND

PLAYBACK REC OUT PLAYBACK REC OUT IN OUT

D EQUALIZER CIRCUIT

AM LOOP ANT | AM ANT | FM ANT | GND

BATTERY CASE

A FM/AM TUNER CIRCUIT

K ICQ CONTROLLER /RELAY DRIVE /OVER LOAD DET. CIRCUIT

J VOLTAGE AMPLIFIER CIRCUIT

L TONE CONTROL/POWER AMP. /REGULATOR CIRCUIT

F NEW CLASS A IND

G VOLUME LEVEL IND. CIRCUIT

VR605 VR604 VR603

bass | treble | balance

S603 S602 S601

subsonic filter | high filter | FM mode

S406 S405 S404 S403 S402 S401

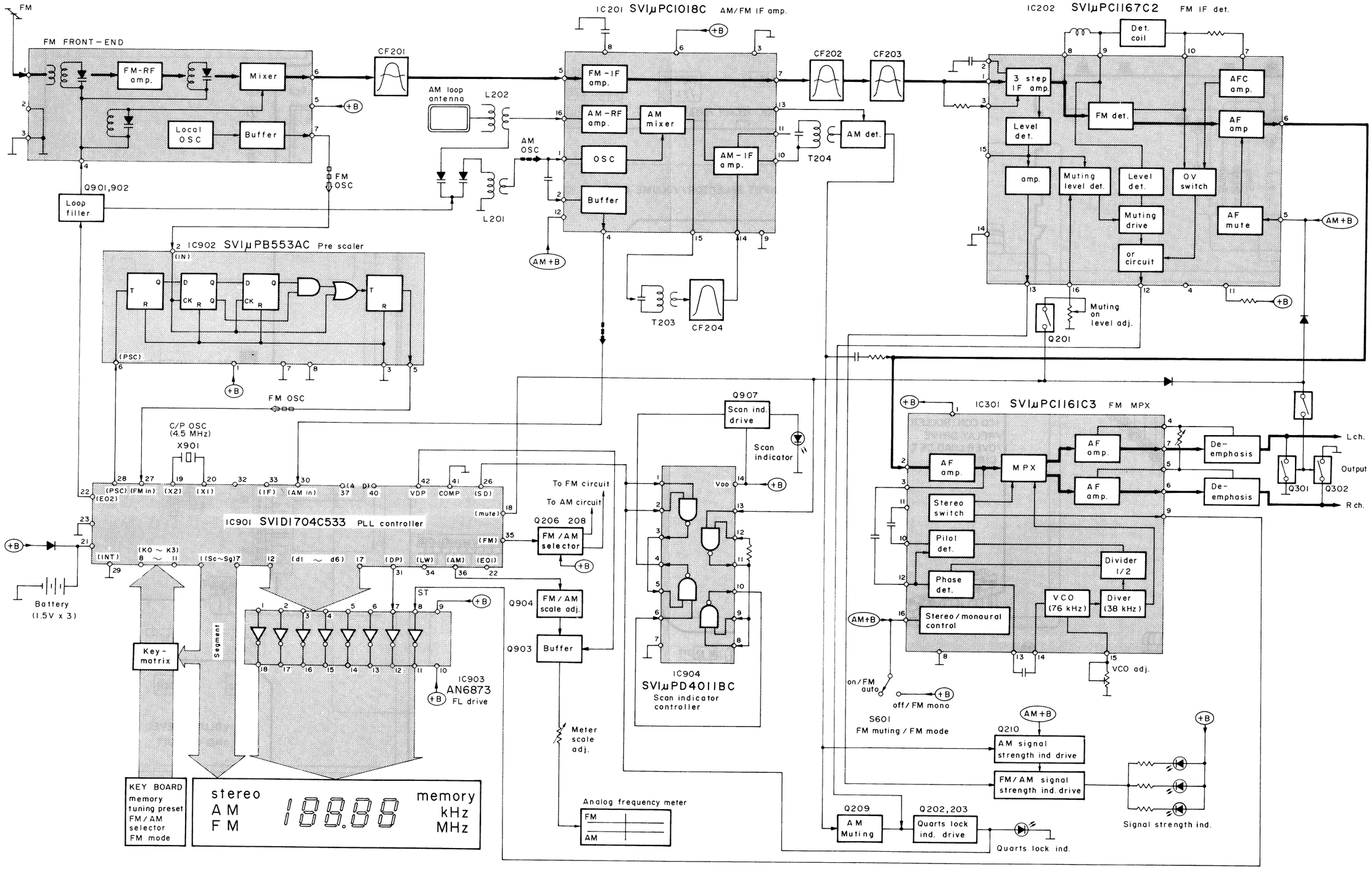
tape monitor | graphic equalizer | loudness | audio muting

aux/CD /video | tuner | phono

volume

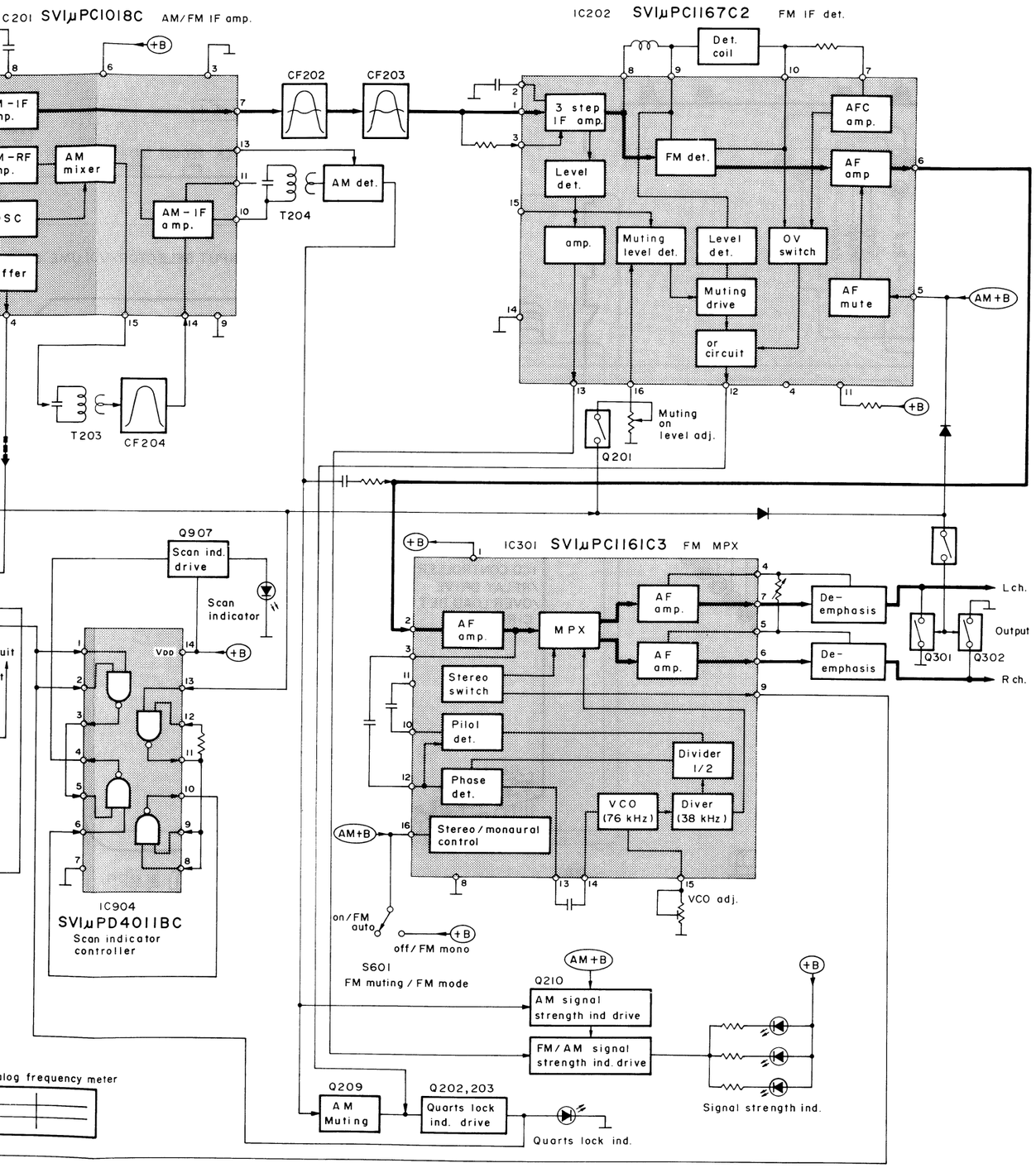
■ BLOCK DIAGRAM

• Tuner (FM/AM) circuit



■ FUNCTION OF

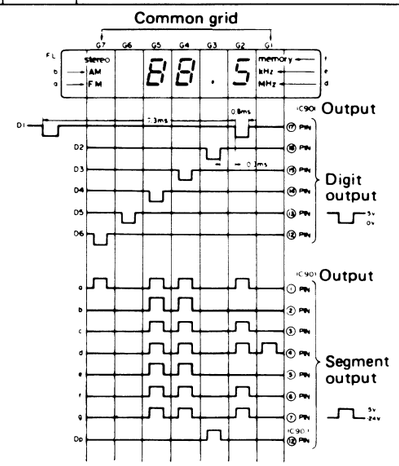
Pin No.	Mark	
1	Sa	Segment sig
2	Sb	(Refer to Fi
3	Sc	
4	Sd	
5	Se	
6	Sf	
7	Sg	
8	K0	Input term
9	K1	external ke
10	K2	terminals (a
11	K3	signal source
12	D6	Digit signal
13	D5	(Refer to Fi
14	D4	
15	D3	
16	D2	
17	D1	
18	MT	This is th shock noise When the output fron
		Powe
		Mutin
19	X2	Connecting The crystal
20	X1	
21	VDD	Power suppl
22	E01	When the higher than output is de When it is delivered. floating.
23	GND	Ground term
24	E02	Not used in
25	CE	This is the the device. the level hig the level low When this te ment (a ~ g are off, but
		Power
		The
		durin
26	SD	This input t a broadcasti during recep
27	FM	Input termin divided to 1/



■ FUNCTION OF TERMINAL (PLL CONTROLLER IC901)

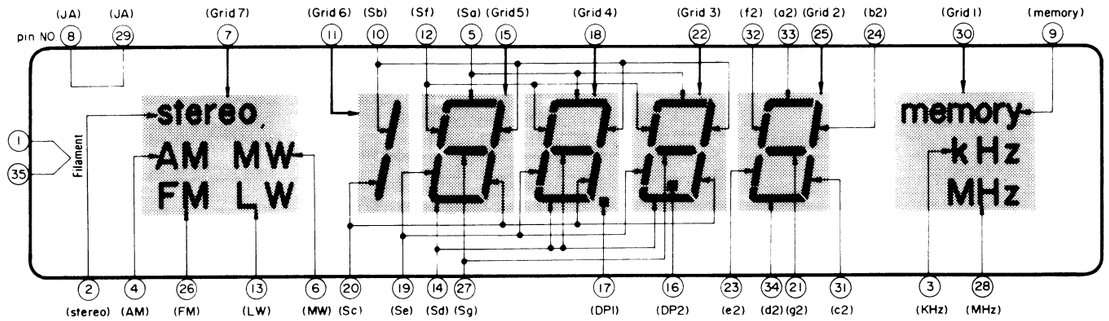
Pin No.	Mark	Description of terminal
1	Sa	Segment signal output terminal for display. (Refer to Fig. 21)
2	Sb	
3	Sc	
4	Sd	
5	Se	
6	Sf	
7	Sg	
8	K0	Input terminal for key return signal from external key matrix. The output of segment terminals (a ~ g) is used as the key return signal source. 4V / 0V
9	K1	
10	K2	
11	K3	
12	D6	Digit signal output terminal for display. (Refer to Fig. 21)
13	D5	
14	D4	
15	D3	
16	D2	
17	D1	
18	MT	This is the output terminal to eliminate shock noise due to unlocking at PLL. When the CE terminal is at low level, the output from this terminal is at high level. Power "ON" / Power "OFF" 700μs 4V 0V Muting "ON" / Muting "OFF"
19	X2	Connecting terminal for crystal oscillator. The crystal connected is at 4.5 MHz.
20	X1	
21	VDD	Power supply terminal of the device.
22	E01	When the divided oscillation frequency is higher than the standard frequency, H-level output is delivered from these terminals. When it is lower, L-level (0V) output is delivered. When they coincide, it results in floating.
23	GND	Ground terminal.
24	E02	Not used in this unit.
25	CE	This is the selected signal input terminal of the device. When operating the device, make the level high, and when it is not used, make the level low. When this terminal is at low level, all the segment (a ~ g) and digits (D1 ~ D6) terminals are off, but the memory is held. Power "ON" / Power "OFF" 4V 0V The device does not operate during this period.
26	SD	This input terminal detects the reception of a broadcasting station. The voltage is 4.2V during reception, and otherwise 0V.
27	FM	Input terminal for FM OSC output frequency-divided to 1/16 or 1/17 by pre-scaler.

Pin No.	Mark	Description of terminal
28	PSC	This is the terminal to deliver the frequency dividing ratio changeover output signal to the pre-scaler. The terminal continues to produce pulses at the rise of the signal applied to FM terminal (27) until the content of the inside swallow counter is 0. When the swallow counter comes to 0, the terminal level becomes low, then the frequency dividing ratio of pre-scaler is 1/16. Pulse two times larger than the value that cannot be divided by VCO/16. 1/17 1/16 5V 0V 25kHz
29	INT	This is the interrupt demand signal input terminal. The signal from the control input terminal is put into this terminal, demanding for interruption, then the flow of program will be unconditionally shifted to the address No. 1.
30	AM	Input terminal for AM OSC output. 2.8V 1.7V 1 MHz ~ 2 MHz
31	PC2	This is 2-bit input/output port, DP terminal (31) is the decimal indication output terminal for the digital display (32) is not used in this unit.
32	PC3	
33	PB0	This is 4-bit input/output port. PB2 terminal (35) is the FM/AM changeover output terminal, which is 5V in FM, and 0V in AM. PB3 terminal (36) is the FM/AM changeover terminal, which is 5V in AM, and 0V in FM. Other terminals are not used in this unit.
34	PB1	
35	PB2	
36	PB3	
37	PA0	This is 4-bit input/output port. (Not used in this unit)
38	PA1	
39	PA2	
40	PA3	
41	PD3	One-bit input/output port. (Not used in this unit.)
42	VDP	One-bit output port. Output signal is emitted to operate the analog frequency meter, and the output voltage varies according to the frequency.



[Fig. 21]

- **Fluorescent Display Tube (FL)**


pin NO
(JA) (JA) (Grid 7) (Grid 6) (Sb) (Sf) (Sa) (Grid 5) (Grid 4) (Grid 3) (f2) (a2) (Grid 2) (b2) (Grid 1) (memory)
8 29 7 11 10 12 5 15 18 22 32 33 25 24 30 9
1 35 Filament
stereo
AM MW
FM LW
memory
kHz
MHz
2 4 26 13 6 20 19 14 27 17 16 23 34 21 31 3 28
(stereo) (AM) (FM) (LW) (MW) (Sc) (Se) (Sd) (Sg) (DP1) (DP2) (e2) (d2) (g2) (c2) (KHz) (MHz)

■ DESCRIPTION OF SPEAKER IMPEDANCE DETECTION CIRCUIT

This circuit serves to detect the impedance of speaker connected to the speaker terminals and to change the secondary tap voltage of power transformer according to the speaker impedance. It consists of a voltage comparing circuit, reset circuit, detection signal generating circuit, and speaker select relay drive circuit.

1) Reset circuit and detection signal generating circuit

The reset switch of speaker select switch is short-circuited only when the switch is shifted, with the speaker select switch shifted, the reset switch is short-circuited, then Q804 of reset circuit turns ON. When Q804 turns ON, positive voltage as in Fig. 22-A is generated at the collector of Q804, causing Q801 to turn ON.

When Q801 turns ON, Q509 turns OFF, and so does RLY801.

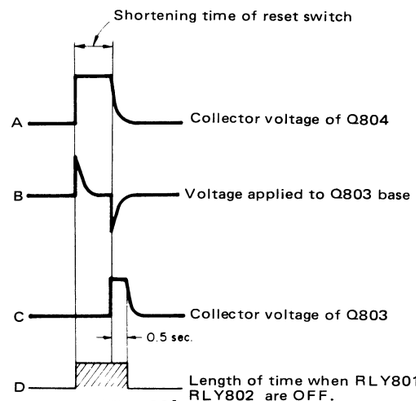
Also, when Q509 turns OFF, the collector potential of Q509 becomes positive, causing Q805 to turn OFF.

When the reset switch is open, a voltage as in Fig. 22-B is applied to the base of Q803 due to the charge and discharge of C803.

With Q803 turned ON, a voltage as in Fig. 22-C is generated at the collector of Q803. The voltage causes Q802 to turn ON.

When Q802 turns ON, RLY801 turns OFF and so does RLY802 (high volt tap). That is, both RLY801 and RLY802 are OFF during short-circuit of reset switch and for 0.5sec. more after opening the switch.

Also, when power switch is turned ON, C806 is charged with voltage, then the base voltage of Q804 becomes 0V and Q804 turns ON. Then both RLY801 and RLY802 turn OFF, and the speaker impedance detecting circuit operate. About 0.5sec. after power switch ON, C806 is discharged and Q804 turns OFF.



[Fig. 22]

2) Voltage comparing circuit

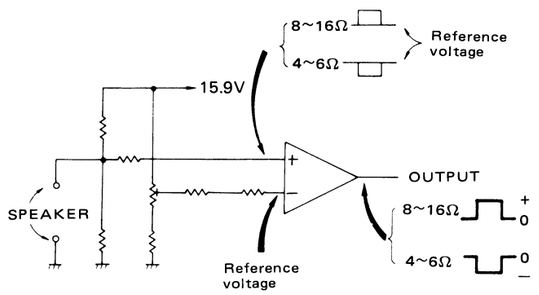
IC801 is a voltage comparing circuit. With RLY801 turned OFF, the speaker is connected to the voltage comparing circuit. (Fig. 23) The reference voltage is applied to minus terminals (② , ⑥) of IC801.

Also, plus terminals (③ , ⑤) of IC801 are subject to change according to the impedance of the speaker connected to the set.

The adjustment has been made with VR801 and VR802 so that the output voltage of IC801 is 0V with 6.5Ω speaker connected. If the impedance of the speaker connected is 4Ω, the output voltage of IC801 becomes negative, causing Q805 to turn ON.

Then RLY802 also turns ON (low volt tap).

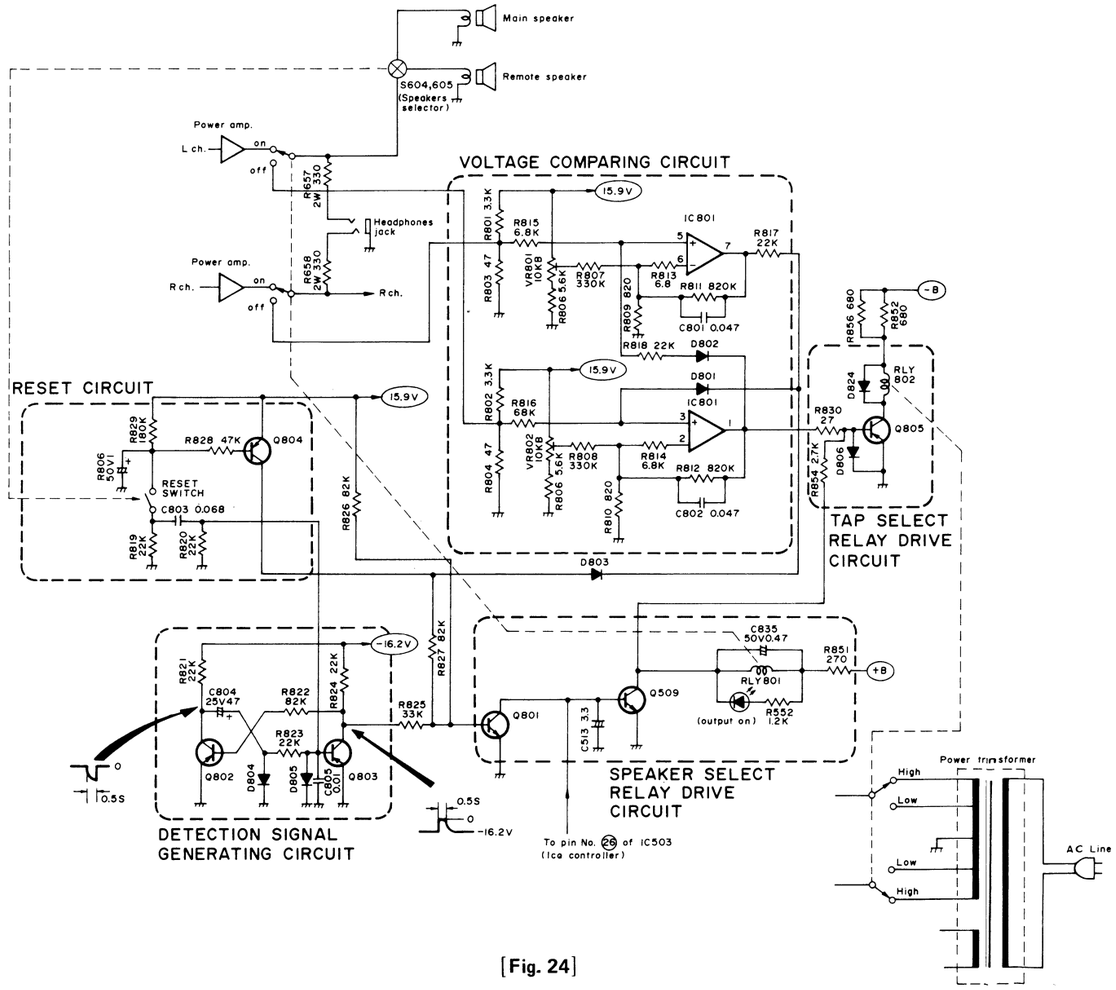
If the speaker impedance is 8Ω, the output voltage of IC801 becomes positive, then Q805 turns OFF and RLY802 also turns OFF (high volt tap).



[Fig. 23]

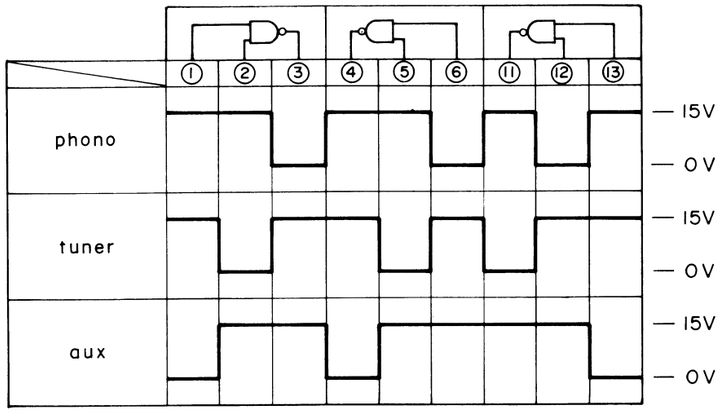
3) Voltage comparing circuit and reset circuit

The operation amplifier of voltage comparing circuit has a nature to hold the impedance 8Ω, or 4Ω once detected. So, if a speaker with different impedance is connected, it is necessary to turn OFF the power supply or shift the speaker select switch before operating the reset circuit.



[Fig. 24]

■ CHART OF IC403 (BAND SELECTOR)



■ FUNCTION OF TERMINAL (VOLUME CONTROL IC404)

Pin No.	Mark	Name of block	Description of terminal
1	VDD	Power supply input terminal	Apply 5V
2	STEP	Test input terminal	Terminal for testing LSI
3	DISP OUT	Display output terminal	Volume level indicator drive output terminal
4	Vcc	Power supply input terminal	Apply 5V
5	VOL IN (1)	Volume input terminal (1)	L-channel volume input terminal
6	NC	Non-connection	Ground
7	VOL OUT (1)	Volume output terminal (1)	L-channel volume output terminal
8	Iout (1)	Current output terminal (1)	L-channel volume current output and feedback resistor connection terminal
9	GND (1)	Ground terminal (1)	L-channel ground terminal
10	GND (2)	Ground terminal (2)	R-channel ground terminal
11	Iout (2)	Current output terminal (2)	R-channel volume current output and feedback resistor connection terminal
12	VOL OUT (2)	Volume output terminal (2)	R-channel volume output terminal
13	NC	Non-connection	Ground
14	VOL IN (2)	Volume input terminal (2)	R-channel volume input terminal
15	Vss	Power supply input terminal	Ground (0V)
16	DOWN	Volume DOWN terminal	It serves to control volume DOWN. Volume down operation with "H" level input voltage applied.
17	UP	Volume UP terminal	It serves to control volume UP. Volume up operation with "H" level input voltage applied.
18	OSC	OSC input terminal	Clock signal (about 400 ~ 430 kHz) can be obtained by internal oscillation circuit.

■ FUNCTION OF TERMINAL (Ico CONTROLLER IC503)

Pin No.	Mark	Name of block	Description of terminal
1	Vss	Power supply input terminal	Grounded (0V)
2	CO_9	Output port C	It delivers Ico control signal through input port A (thermal sensor) and input port B (signal sensor). [Output "L"]
3	CO_8		
4	CO_7		
5	CO_6		
6	CO_5		
7	AI_3	Input port A	When DC detection circuit of power amplifier operates, the input level becomes "H".
8	AI_2		Not used in this unit.
9	AI_1		
10	AI_0		When 70°C (158°F) sensor of power amplifier operates, the input level becomes "L".

Pin No.	Mark	Name of block	Description of terminal
11	BI_3	Input port B	Input level changes to "L" as effective output 2V signal sensor of power amplifier operates. (L ch.)
12	BI_2		Input level changes to "L" as effective output 5V signal sensor of power amplifier operates. (L ch.)
13	BI_1		Input level changes to "L" as effective output 2V signal sensor of power amplifier operates (R ch.)
14	BI_0		Input level changes to "L" as effective output 5V signal sensor of power amplifier operates (R ch.)
15	EO_0	Output port E	Indicator "thermal" lights up at "L" output.
16	EO_1		Indicator "signal" lights up at "L" output.
17	EO_2		Indicator "auto" lights up at "L" output.
18	EO_3		Indicator "stand by" lights up at "L" output.
19	TST	Test input terminal	Terminal for testing LSI (Grounded)
20	RST	Reset input terminal	All outputs are cleared or reset with input at "L" (It is connected to power supply circuit)
21	SNS_0	Sensor input terminal	Conditional transfer (branach) is performed according to the input level.
22	SNS_1		Input level changes to "H" as power amplifier output short-circuit operates.
23	DO_0	Output port D	Indicator "preheat" lights up at "L" output
24	DO_1		Not used in this unit.
25	DO_2		
26	DO_3		Output relay turns ON with output at "H"
27	VDD	Power supply input terminal	Apply 5V.
28	OSC	OSC input terminal	Clock signal (about 400 kHz) can be obtained by internal oscillation circuit.

● **ON-time of each indicator, and output generated at pin terminal of microcomputer (IC503)**

▒ "ON" (light up) time

Output port	(4) pin CO_7	(2) pin CO_8	(3) pin CO_9	(15) pin EO_0	(16) pin EO_1	(17) pin EO_2	(18) pin EO_3	(26) pin DO_3	(23) pin DO_0
Ind. / sec.	bias thermal	bias high	bias low	sensor thermal	sensor signal	ICQ auto	output stand by	output on	ICQ preheat
Power "ON"	Ⓛ	Ⓛ	Ⓛ	Ⓛ	Ⓛ	Ⓛ	Ⓛ	Ⓛ	Ⓛ
0.4 sec.									
0.8 sec.	Ⓗ	Ⓗ				Ⓗ	Ⓗ		
0.4 sec.							Ⓛ		
0.4 sec.							Ⓗ		
0.4 sec.							Ⓛ		
0.4 sec.		Ⓛ	Ⓗ		Ⓗ		Ⓗ		
0.4 sec.							Ⓛ		
0.4 sec.							Ⓗ		
0.4 sec.				Ⓗ	Ⓛ		Ⓛ		
0.4 sec.							Ⓗ		
0.4 sec.							Ⓛ		
0.4 sec.	Ⓛ	Ⓗ			Ⓗ		Ⓗ		
0.4 sec.							Ⓛ		
0.4 sec.							Ⓗ		
14 sec.	Ⓗ		Ⓛ	Ⓛ	Ⓛ			Relay ON	
6 sec.			Ⓗ			Ⓛ		Ⓗ	Ⓗ

[Fig. 25]

■ OPERATION OF I_{CQ} CONTROLLER

Computer-drive monitor indicators

To prevent transient crossover distortion*, a stabilized idling current (ICQ) through the power transistors is constantly necessary.

ICQ will vary with the signal level and the instantaneous temperature of the power transistors.

The microcomputer will optimize ICQ automatically by preheating the power transistors and sensing the signal level and the temperature of the power transistors.

* Transient crossover distortion is caused by momentary fluctuations of the ICQ level.

ICQ

When the power is turned on, the "preheat" indicator will illuminate. This shows that a high level of ICQ is flowing through the power transistors to achieve circuit stability quickly. When "auto" illuminates, the optimum ICQ level is flowing and being controlled by the microcomputer.

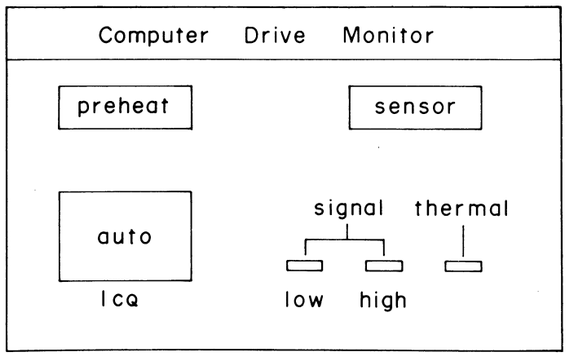
Sensor

- **Signal**

  When the signal level is very low, both the "low" and "high" indicators will illuminate. As the signal level is increased, the "low" indicator will go out. When the signal level is further increased, both indicators will be out.

- **thermal**

  When the "thermal" indicator illuminates, the temperature of the heatsink is low and no adjustment of ICQ is required by the microcomputer. When the "thermal" indicator goes off, the microcomputer is adjusting the ICQ because of the temperature rise of the heatsink,.



Output indicators (output)

These indicators show the condition of the signal sent to speakers or headphones.

When the power switch is switched on, the "stand by" indicator flashes, and, when the unit is operating normally, the "on" indicator will illuminate.

Note that the "stand by" indicator will flash if the positive and negative speaker terminals or speaker connection cords are short-circuited, or if some other circuit abnormality which causes the protection circuit to function is detected. If this occurs, switch the power switch off, and then on again after first determining the cause of the problem and correcting it.

1) Preheat

When power supply is turned ON, the level of IC503 pin ㉓ becomes low. At the same time, preheat LED (D530) lights up. Q510 turns ON, then voltage is applied to LED's (D533), (D536), (D537). Each of D533, D536 and D537 is controlled by IC503 terminals ② , ③ and ④ respectively. The output voltages are shown in Fig. 25. The "low" LED lights up first, followed by "high" LED, and then "thermal" LED. IC503 Pin ⑰ turns power supply ON as in Fig. 25. It becomes "H" 0.4 sec. later, then IC502 pin ⑤ (⑥) also becomes "H". IC502 pin ⑫ (⑪) changes to "L" and it is applied to Q617 (Q618), causing Q617 (Q618) to turn ON. IC502 pin ⑫ (⑪) delivers a large ICQ for 6 sec. after power ON (while pin ⑫ (⑪) is "L"), and after that, pin ⑫ (⑪) become "H". ICQ is controlled by the output of IC503 pin ② , ③ , ④ .

2) Signal sensor and thermal sensor

The musical signal from power amplifier is applied to IC503 pin ⑪ or ⑫ (pin ⑬ or ⑭) through D505 (D506) and IC501. When the signal changed to DC by D505 (D506) and C503 (C504), becomes about 2V, then "L" input is applied to IC503 pin ⑪ (pin ⑬), becomes about 5V, then "L" input is applied to IC503 pin 12 (pin ⑭), and the output is delivered to IC503 pin ② , ③ , ④ . Also, when the temperature of heat-sink becomes higher than 70°C the resistance of the thermistor (PS501) increases and IC501 pin ③ becomes "H". IC501 pin ⑭ changes to "L", then "L" input is applied to IC503 pin ⑩ . The output is delivered to IC503 pin ⑪ , ⑬ (pin ⑫, ⑭) [signal sensor input] and IC503 pin ⑩ (thermal sensor input), thereby controlling ICQ through R524, R527, R529 (R525, R526, R528) and Q617, Q618.

3) Power on/off muting

When power supply is turned ON, the output of IC503 pin ㉖ is "L" for about 6 sec. as in Fig. 25 , then relay RLY801 turns OFF, and D528 output "on" LED also turns OFF. The voltage of IC503 pin ⑱ alternately becomes "L" and "H" for 6 sec. after power ON as in Fig. 25 , causing D527 "stand by" LED to blink. IC503 pin ㉖ output becomes "H" 6 sec. after power ON, then relay RLY801 turns ON and D528 output "on" LED lights up.

When power supply is turned OFF, "H" is applied to IC502 pin ④ and IC502 pin ⑬ output changes to "L" because the time constant of C807 (1.5μF) and R832 (18kΩ) is smaller than that of C808 (12000μF) and R831 (82kΩ). The signal is put into IC503 pin ⑳ while "L" output is delivered to IC503 pin ㉖ .

When pin ㉖ becomes "L", Q509 turns OFF and so does relay RLY801.

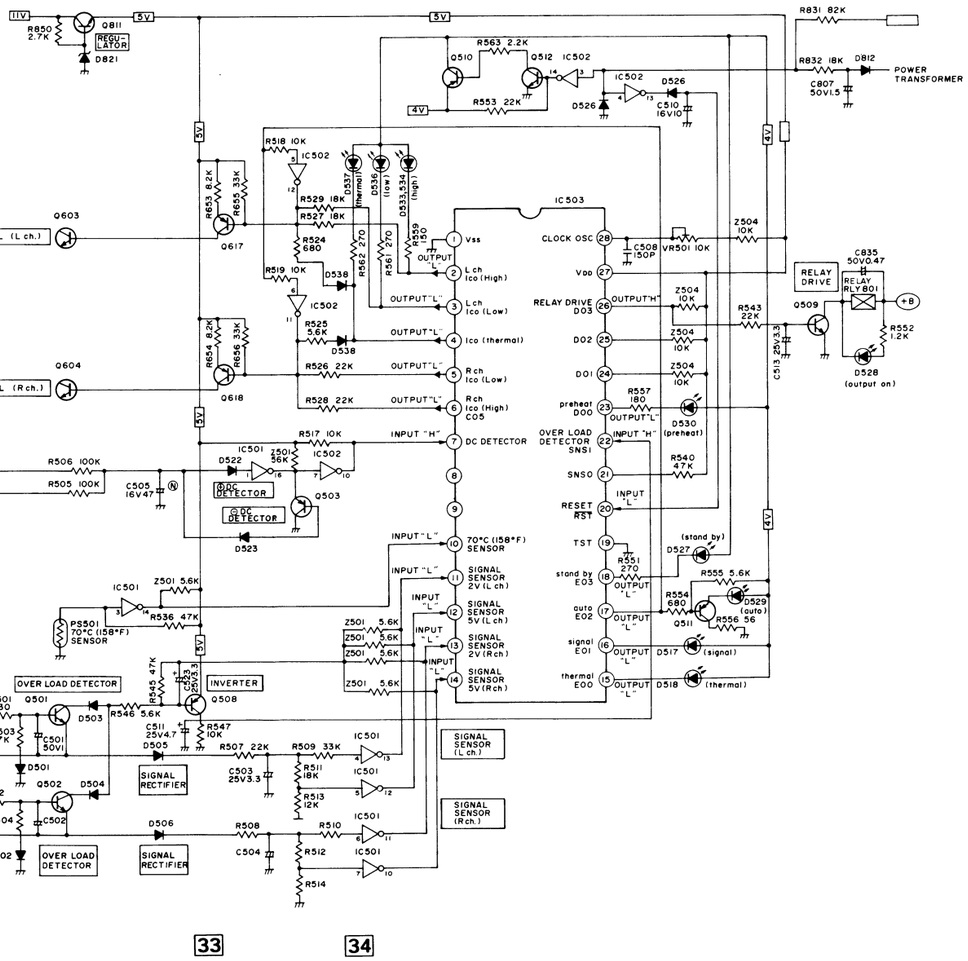
4) DC detection circuit

When the power amplifier voltage is over 2V DC. IC501 pin ① (⊕ DC detection) and Q503 (⊖ DC detection) are turned ON, then "H" input is applied to IC503 pin ⑦ , and "L" output is delivered to IC503 pin ㉖ . When pin 26 becomes "L", relay RLY801 turns OFF the same as in power-off muting.

5) Overload detector circuit

When speaker terminals are short-circuited, a large amount of current flows into Z601 (Z602), and the base voltage of Q501 (Q502) increases, causing Q501 (Q502 and Q508 to turn ON. As Q508 turns ON, "H" input is applied to IC503 pin ㉒ , and "L" output is delivered to IC503 pin ㉖ . When pin ㉖ becomes "L", relay RLY801 turns OFF the same as in power off muting.

When "H" is applied to IC508 pin ㉒ , the output of IC503 pin ㉖ is held. Therefore, turn off the power switch and check the set beforehand. Otherwise, relay RLY801 will not turn ON.



■ BLOCK

- **Input sele**
  Tap select

PHONO (L ch.)

PHONO (R ch.)

AUX (L ch.)

AUX (R ch.)

From tuner circuit (R ch.)

From tuner circuit (L ch.)

503 pin
eat-sink
of the
ecomes
input is
ered to
input]
thereby
(R525,

f IC503
en relay
ED also
rnately
N as in
. IC503
er ON,
t "on"

lied to
to "L"
d R832
F) and

R831 (82kΩ). The signal is put into IC503 pin ⑳ while "L" output is delivered to IC503 pin ㉖ .
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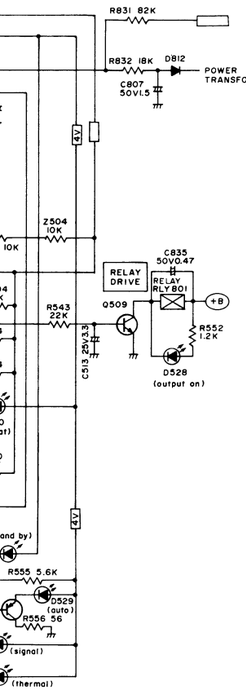
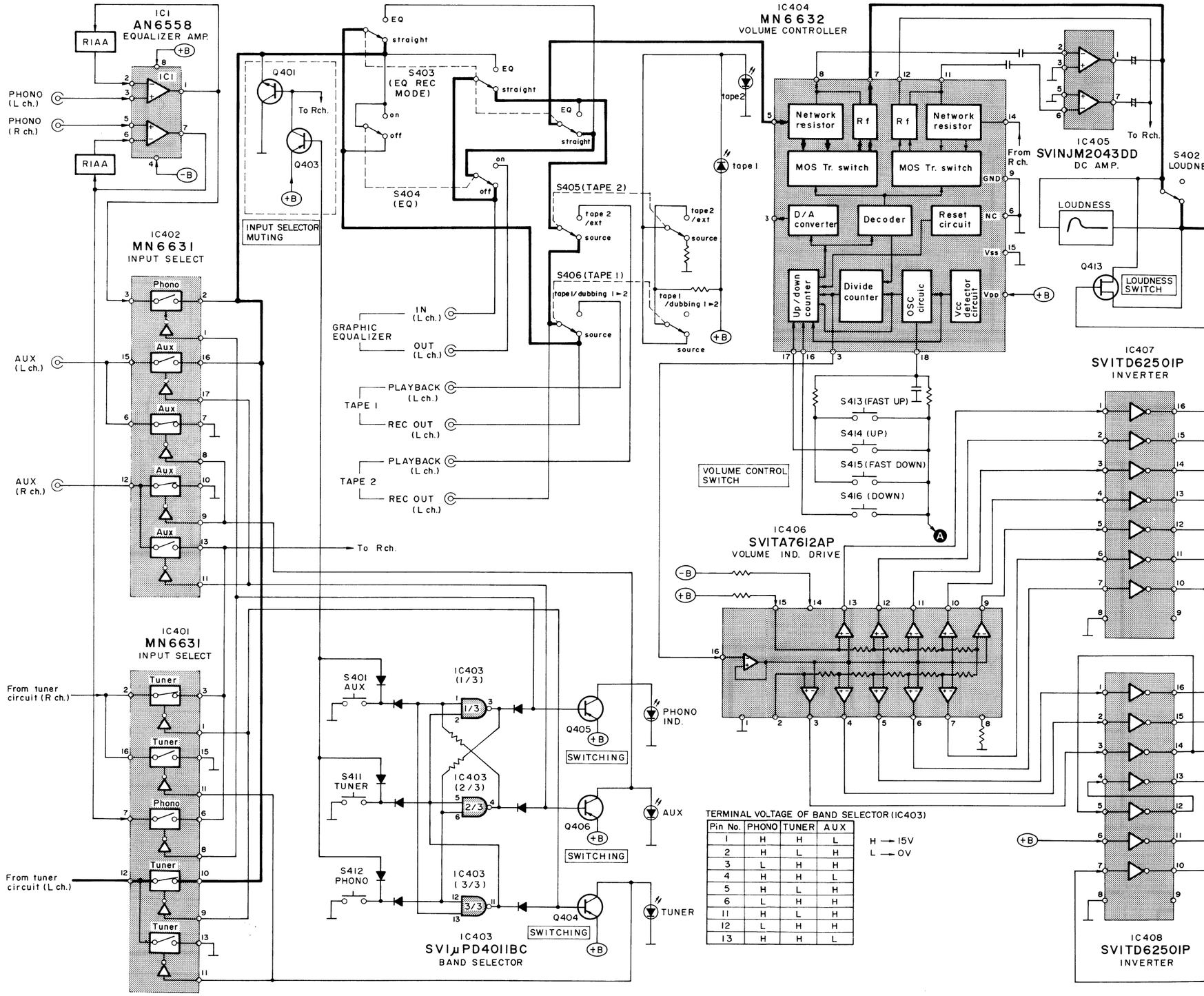


■ BLOCK DIAGRAM

- **Input selector / Equalizer / Volume control / Ico control / DC detector / Overload detector / Tap selector / Pri · Drive · Power amp. / Power supply circuit.**



TERMINAL VOLTAGE OF BAND SELECTOR (IC403)

Pin No.	PHONO	TUNER	AUX
1	H	H	L
2	H	L	H
3	L	H	H
4	H	H	L
5	H	L	H
6	L	H	H
11	H	L	H
12	L	H	H
13	H	H	L

H → 15V
L → 0V

etector /

IC404
MN6632
VOLUME CONTROLLER

Network resistor
Rf
Rf
Network resistor
MOS Tr. switch
MOS Tr. switch
D/A converter
Decoder
Reset circuit
Up/down counter
Divide counter
OSC circuic
Vcc detector circuit
NC
Vss
Vpp
GND

IC405
SVINJM2043DD
DC AMP.

From Rch.
To Rch.

S402
LOUDNESS

LOUDNESS

Q413

LOUDNESS SWITCH

S401
AUDIO MUTING

HIGH-CUT FILTER
S602

SUBSONIC FILTER
S603

BALANCE CONTROL

To Rch.
From Rch.

TONE

IC601
SVINJM4559SM
TONE AMP.

To Rch.

tape2
tape1
tape2 /ext
source
tape1 /dubbing 1►2
source
+B

S413(FAST UP)
S414 (UP)
S415(FAST DOWN)
S416 (DOWN)

VOLUME CONTROL SWITCH

IC406
SVITA7612AP
VOLUME IND. DRIVE

-B
+B

IC407
SVITD6250IP
INVERTER

VOLUME LEVEL IND.

PHONO IND.
AUX
TUNER

TERMINAL VOLTAGE OF BAND SELECTOR (IC403)

Pin No.	PHONO	TUNER	AUX
1	H	H	L
2	H	L	H
3	L	H	H
4	H	H	L
5	H	L	H
6	L	H	H
11	H	L	H
12	L	H	H
13	H	H	L

H → 15V
L → 0V

Q410
MUTING

To Rch. (Q412)

IC408
SVITD6250IP
INVERTER

LFB
Current mirror
Cascade
Current stabilizer
Bias
Muting
GND
-Vcc

VOLTAGE AMP
Q72

IC701
AN7062
VOLTAGE AMP.

Q601
Bias

Q605
Pre-drive
Q607
Pre-drive

Synchro-nous bias circuit

Q609
Driver
Q611
Driver

Q613
Power amp.
Q615
Power amp.

HEADPHONES
From Rch.
(MAIN)
(REMOTE)
off
on
MAIN (Lch.)
REMOTE (Lch.)

Q617
Bias control

IC801
AN6552
VOLTAGE COMPARATOR

Reset switch
Reset circuit
Q804

Q501
OVER LOAD DETECTOR

VR801
(Impedance det. adj.)

Q508
SWITCHING

VR802
(Impedance det. adj.)

Q805
Tap select relay drive

Relay 802

SIGNAL SENSOR

IC501

From Rch.

Q802, 803
Ditection signal generating circuit

DC DETECTOR CIRCUIT

Q503
IC501
INVERTER

Q510
SWITCHING
thermal
low
high

IC502
INVERTER

Q512
SWITCHING

IC502
INVERTER

Preheat

Thermal sensor
PS501
IC501

Calculation of optimum bias
IC503
MN1421STA
ICQ CONTROL
Protection circuit
Muting

OUTPUT H

Clock OSC adj. (400kHz)

Q511
SWITCHING

low
signal
auto
stand by

POWER ON-OFF DETECTOR

Q801
Speaker select relay drive

Relay 801

OUTPUT ON

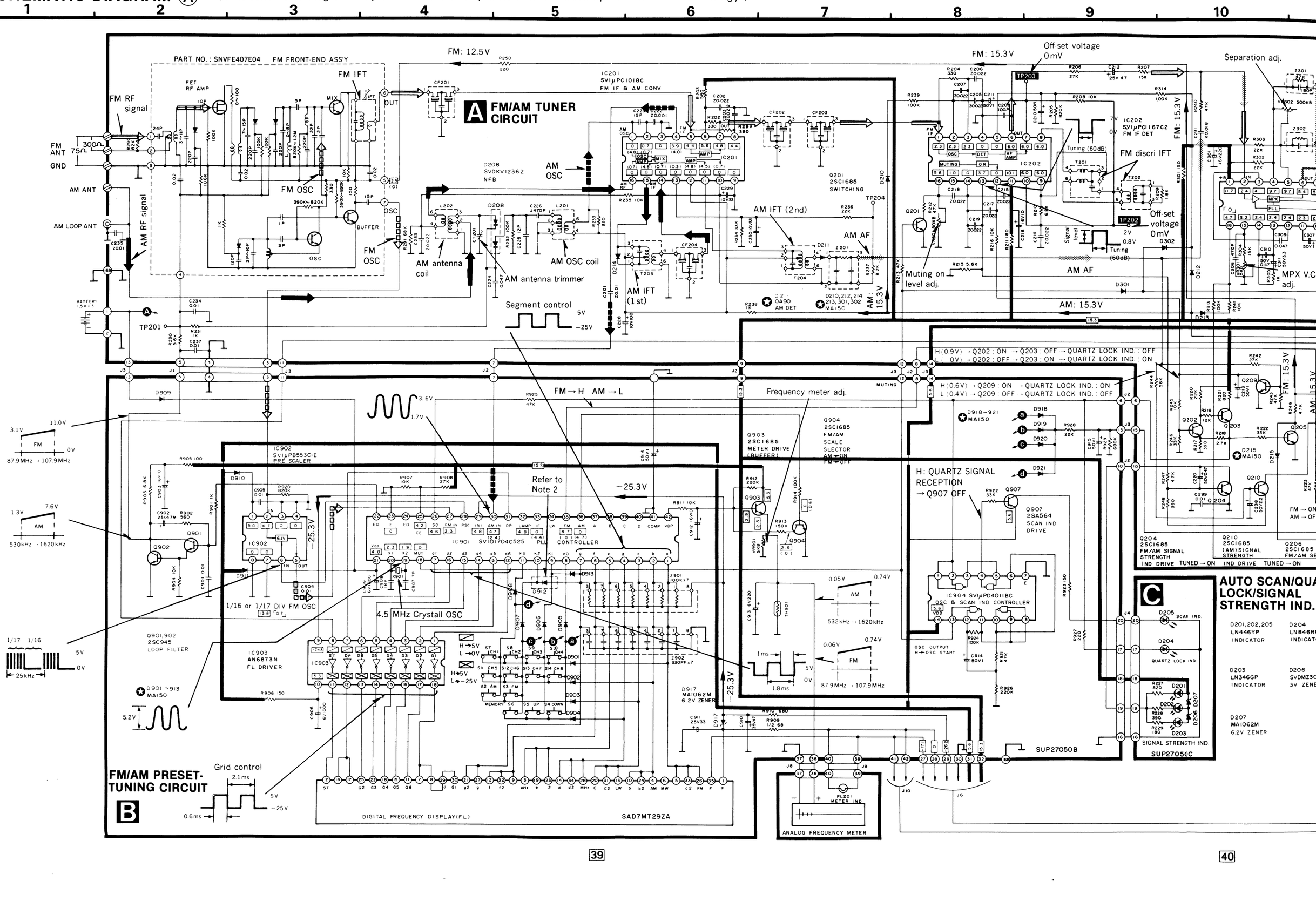
Q509
SWITCHING

Rectifier

Power transformer
high
low
low
high
AC Line

■ SCHEMATIC DIAGRAM Ⓐ

(This schematic diagram may be modified at any time with the development of new technology.)



TAPE-MONITOR IND. CIRCUIT NEW CLASS

D EQUALIZER CIRCUIT

SUP24313

IC1 AN6558F EQUALIZER AMP

Q401,402 2SD1011 MUTING

Q403 2SA564ANC MUTING

Q403

Q402 Q401

SUP27070D

H

D430 LN0202YP4 TAPE IND.

D430

D431 LN0202YP4 TAPE2 IND.

D431

SUP27070C

F

D415 LN0603GP3G NEW CLASS AIND.

S405,406 TAPE MONITOR

S403,404 GRAPHIC EQUALIZER

S403 EQ rec

S404 EQ

S405 tape2

S406 tape1

TUNER : H
PHONO : L
AUX : H

TUNER : L
PHONO : H
AUX : H

TUNER : L
PHONO : L
AUX : H

TUNER : H
PHONO : H
AUX : L

TUNER : H
PHONO : L
AUX : L

−16.3V

16.3V

IC401 IC402

IC401,402 MN6631 INPUT SELECT

IC401, 402 are phono to "on" position.

1	☒	4	16.0	7	0	10	0	13	0	16	0				
2	0	5	0	8	☒	11	☒	14	16.0	17	☒				
3	0	6	0	9	☒	12	0	15	0	18	16.0				

☒ H: 15V, L: 0.9V

GRAPHIC EQUALIZER OUT
GRAPHIC EQUALIZER IN
TAPE 2 PLAYBACK
TAPE 2 REC OUT
TAPE 1 PLAYBACK
TAPE 1 REC OUT

E INPUT SELECTOR/ VOLUME CONTROL CIRCUIT

PHONO
AUX/CD VIDEO
PLAYBACK TAPE1 REC OUT
PLAYBACK TAPE2/EXT REC OUT
GRAPHIC EQUALIZER IN OUT

R498 680
R499 680
R455 270K R456
R457 270K R458

C AUTO SCAN/QUARTZ LOCK/SIGNAL STRENGTH IND.

D201,202,205 LN446YP INDICATOR
D204 LN846RP INDICATOR
D203 LN346GP INDICATOR
D206 SVDMZ303B 3V ZENER
D207 MA1062M 6.2V ZENER

SUP27050C

SUP27050A

SUP27050B

SCAN IND.
QUARTZ LOCK IND.
SIGNAL STRENGTH IND.

Off-set voltage 0mV
FM: 15.3V
AM: 15.3V
AM AF
Muting on level adj.
FM discri IFT
Tuning (60dB)
Signal level
Off-set voltage 0mV
Separation adj.
MPX V.C.O. adj.
19kHz output
Tuner AF signal output

IC202 SVIμPC1167C2 FM IF DET
IC301 SVIμPC1161C3 MPX
IC904 SVIμPD4011BC OSC & SCAN IND CONTROLLER
OSC OUTPUT H→OSC START

Q201 2SC1685 SWITCHING
Q209 2SC1685 AM MUTING
Q202,203 2SC1685 QUARTZ LOCK IND DRIVE
Q205 2SC1685 FM MUTING
Q301,302 2SC1685 MUTING
Q303 2SA564 MUTING CONTROL
Q904 2SC1685 FM/AM SCALE SLECTOR AM→ON FM→OFF
Q907 2SA564 SCAN IND DRIVE
Q204 2SC1685 FM/AM SIGNAL STRENGTH IND DRIVE TUNED→ON
Q210 2SC1685 (AM) SIGNAL STRENGTH IND DRIVE TUNED→ON
Q206 2SC1685 FM/AM SELECTOR TUNED→ON
Q304 2SC1685 TUNER SELECTOR
Q207,208 2SA564 FM/AM SELECTOR

D210,212,214 213,301,302 MA150
D918~921 MA150
D215 MA150
D404~410 MA150

H(0.9V) →Q202 : ON →Q203 : OFF →QUARTZ LOCK IND. : OFF
L (0V) →Q202 : OFF →Q203 : ON →QUARTZ LOCK IND. : ON
H(0.6V) →Q209 : ON →QUARTZ LOCK IND. : ON
L (0.4V) →Q209 : OFF →QUARTZ LOCK IND. : OFF
H: QUARTZ SIGNAL RECEPTION →Q907 OFF
FM→OFF AM→ON
FM→ON AM→OFF

0.05V 0.74V AM 532kHz→1620kHz
0.06V 0.74V FM 87.9MHz ·107.9MHz

PL201 METER IND
LOG FREQUENCY METER

Q412,413 2SJ103 LOUDNESS SWITCH

Lower than the "3" mar
volume control → 15V
Higher than the "4" ma
the volume control → 0

15 16 17 18 19 20 21 22 23

TAPE-MONITOR IND. CIRCUIT

NEW CLASS A IND.

G VOLUME LEVEL IND. CIRCUIT

VOLUME LEVEL IND.

D420 ~ 429 LN41YPHLMS

D420 D421 D422 D423 D424 D425 D426 D427 D428 D429

PL401 PL402 VOLUME IND.

SUP27070B

SUP27070D

H

D430 LN0202YP4 TAPE1 IND.

D431 LN0202YP4 TAPE2 IND.

SUP27070C

F

D415 LN0603GP3G NEW CLASS A IND.

VOLUME S413 FAST(UP) S414 UP

FAST(DOWN) S415 DOWN S416

INPUT SELECTOR

AUX/CD/VIDEO S410 TUNER S411 PHONO S412

D432~438 LN846RP

AUX/CD/VIDEO IND. TUNER IND. PHONO IND.

R427 390K R428 330K R424 470 R425 560 R426 560

Q401,402 2SD1011 MUTING

Q403 2SA564ANC MUTING

Q401 Q402 Q403

R415 10K R416 10K R417 33K R404 R405 220K

C411 25V10 C412 25V10 C401 47 C402

R470 10 (MC) only R471 10 (MC) only

R401 560 R402 R433 180

R454 180 R449 12 560 R429 180

S405,406 TAPE MONITOR

D401~403 SVDMC921

S403,404 GRAPHIC EQUALIZER

S403 EQ rec S404 EQ S405 tape2 S406 tape1

TUNER : L PHONO : L AUX : H

TUNER : H PHONO : H AUX : L

IC402

IC401, 402 are phono to "on" position.

H: 15V L: 0V

IC403 SVIμ PD4011BC NAND GATE

TUNER : L PHONO : H AUX : H

TUNER : H PHONO : L AUX : H

TUNER : H PHONO : H AUX : L

D403 D402 D401 D404 D405 D406 D407 D408 D409

R452 15K R451 15K R450 15K R418 15K R419 15K R420 15K R421 15K R422 15K R423 15K

Q404 TUNER →ON Q405 PHONO →ON Q406 AUX →ON

Q404 2SA564ANC AUX IND. DRIVE Q405 2SA564ANC TUNER IND. DRIVE Q406 2SA564ANC PHONO IND. DRIVE

D404~410 MA150

Q412,413 2SJ103 LOUDNESS SWITCH

Lower than the "3" mark of the volume control → 15V

Higher than the "4" mark of the volume control → 0V

−16.3V

IC406 SVITA7612AP VOLUME IND DRIVE

IC407,408 SVITD62501P INVERTER

Z401 5.6K×7

R438 10K R430 10K R436 1K R435 1K R437 220K R439 270 R440 560 R441 39K R442 560 R443 1W 270

IC406 IC407 IC408

D440 D414

D410 SVDMZ309A

Q410,411 2SJ104 TONE AMP SWITCH

R444 220K R445 220K R429 0.047

C415 6V47 C418 50V10 C430 0.047

D413,414 MA1030L 3V ZENER

R407 120K C409 M0.1 R405 220K C407 33P C425 150P C421 0.047

IC404 MN6632 VOLUME CONTROLLER

VDD STEP DOUT VCC V.IN NC NC VOUT LOUT GND

OSC UP DOWN VSS V.IN NC VOUT LOUT GND

C424 0.047 C417 M 0.047 C423 50V3.3 C422 50V3.3

LCH RCH

R406 C408 C406 16.3V R408 C410

IC405 SVINJM2043DD DC AMP

S402 LOUDNESS S401 AUDIO MUTING

R411 15K R412 R410 R409 15K

Q408,409 2SA684NC REGULATOR (CURRENT)

Q408 R446 100 C419 6V330 Q409 R447 100 D412

SUP27070A

J10 J13 J14 J16 J17 J18 J24

41 42

L TONE CONTROL/POWER AMP./ REGULATOR CIRCUIT

Q605,606 2SC2631R PRE DRIVE

Q601,602 2SC1685NC BIAS CONTROL	D615 MA1180	Q613,614 2SC3182R POWER AMP	Q609,610 2SC2592 DRIVE	D823 MA150
Q603,604 2SC2631R Icq CONTROL	Q607,608 2SA1123R PRE DRIVE	Q615,616 2SA1265R POWER AMP	Q611,612 2SA1112 DRIVE	D603~606 20A90

VOLTAGE AMPLIFIER CIRCUIT

Q71,72 2SA1123 VOLTAGE AMP

IC71 AN7062 VOLTAGE AMP SUP26070D

D71,72 MA162A

IC601 SVINJ4559DSM FLAT AMP

D607~610 0A90

D601,602 611~614 MA27WA

Icq adj. (Lch)

Icq adj. (Rch)

TP1 TP2 TP3 TP4 Icq adj.

−16.3V −55.2V

NFB

Treble Bass

S601 FM MODE (on/FM auto ⇒ off/FM mono)

S602 high filter

S603 subsonic

off ⇒ on

HEADPHONES JACK

SUP27035F

SUP27035C

5605 MAIN

5604 REMOTE

SPEAKER (MUTING) off ⇒ on

(MC) only

L ch MAIN R ch SPEAKERS

L ch REMOTE R ch

SPEAKER (MUTING) RELAY

PS501 Temperature det. (70°C (158°F))

Q618 2SA992 Icq CONTROL

K

Q501,502 2SC1845

Q503 2SA564ANC

D505,506 MA162A

D501,502 MA162A

D503,504 MA162

D523 MA27WA

IC501 SVITD6250IP CONVERTER

IC502 SVITD6250IP INVERTER

D522 MA150

D526 0A90

2.6V

Clock

TP501

Z501 56K×7

L501 Z0.022

L

Load impedance detection 0mV

Q801 2SC1845 SGNAL DETECTION

Q802,803,804 2SA564ANC SWITCHING

Q805 2SA992 TAP SELECT RELAY DRIVE

D801~806 MA150

D824 MA150

TAP SELECT RELAY

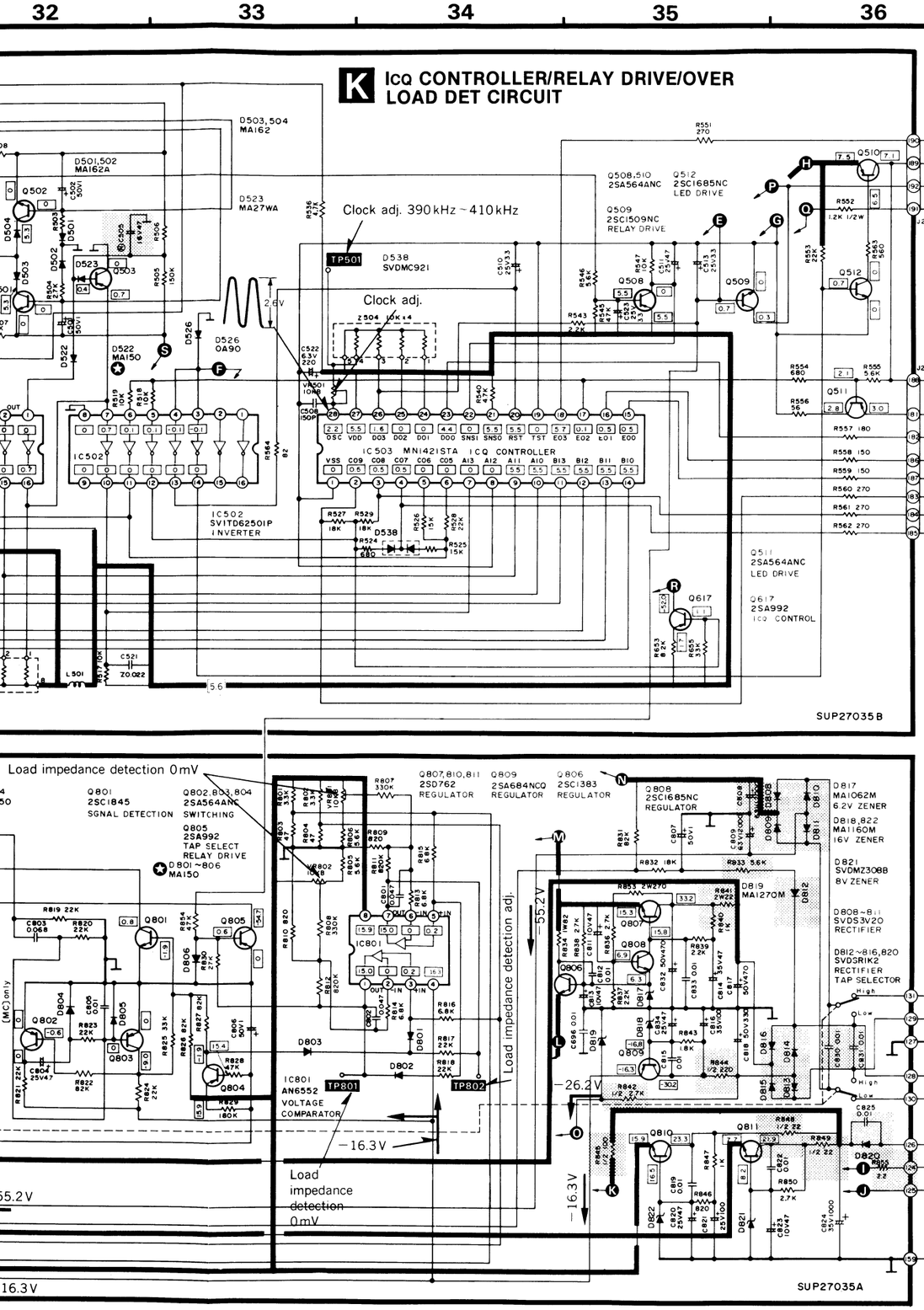
(MC) (M)

IC801 AN6552 VOLTAGE COMPARATOR

TP801

Load impedance detection 0mV

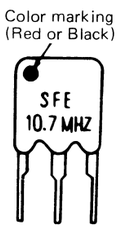
−16.3V −55.2V



Note 2:

- **Use of ceramic filters in pairs**

The ceramic filters (CF101 ~ CF104) for FM-IF circuit are available in two ranks. For this machine, be sure to use the ceramics of the same rank in a pair.
At repairing and replacement, pay close attention to the diode (D902) for use as different diodes must be used depending on each rank of the ceramic filters.



RANK (Color)	D912	CENTER FREQUENCY
Black	O	10.65 MHz
Red	X	10.70 MHz

Note: O Mark Diode is used.
X Mark Diode is not used.

■ SCHEMATIC DIAGRAM Ⓑ

(This schematic diagram may be modified at any time with the development of new technology.)

Note 1:

1. **S2, 3** : Band selectors switch.
   S2 —— AM S3 —— FM
2. **S4, 5** : Tuning control switch
   S4 —— down (tuning to lower frequency)
   S5 —— up (tuning to high frequency)
3. **S6** : Memory switch.
   (manual ⟷ auto)
4. **S7 ~ S14** : Preset tuning switch.
   S 7 —— CH1 —— CH 9 S11 —— CH5 —— CH13
   S 8 —— CH2 —— CH10 S12 —— CH6 —— CH14
   S 9 —— CH3 —— CH11 S13 —— CH7 —— CH15
   S10 —— CH4 —— CH12 S14 —— CH8 —— CH16
5. **S401** : Audio muting switch in "**0 dB**" position.
   0dB ⟷ 20dB
6. **S402** : Loudness switch in "**off**" position.
   off ⟷ on
7. **S403** : Graphic equalizer rec mode switch in "**straight**" position.
8. **S404** : Graphic equalizer switch in "**off**" position.
   off ⟷ on
9. **S405** : Tape monitor switch in "**source**" position.
   source ⟷ tape 2/ext
10. **S406** : Tape monitor switch in "**source, tape 1**" positon.
    source, tape 1 ⟷ dubbing 1 ▶ 2
11. **S410 ~ S412** : Input selectors switch.
    S410 —— phono
    S411 —— tuner
    S412 —— aux/CD/video
12. **S413 ~ S416** : Volume control switch.
    S413 —— fast up S415 —— fast down
    S414 —— up S416 —— down
13. **S601** : FM muting/mode switch in "**on/FM auto**" position.
    on/FM auto ⟷ off/FM mono
14. **S602** : High-cut filter switch in "**off**" position.
    off ⟷ on
15. **S603** : Subsonic filter switch in "**off**" position.
    off ⟷ on
16. **S604** : Remote speaker switch in "**off**" positon.
    off ⟷ on
17. **S605** : Main speaker switch in "**on**" position.
    off ⟷ on
18. **S1001** : Power switch in "**on**" position.
19. Indicated voltage values are the standard values for the unit measured by the DC electronic circuit tester (high-impedance) with the chassis taken as standard. Therefore, there may exist some errors in the voltage values, depending on the internal impedance of the DC circuit tester.
    * Figures in [ ] standard for DC voltage in FM signal (monaural signal) reception mode.
    * Figures in < > standard for DC voltage in AM signal reception mode.
    * Figure in ( ) stand for DC voltage in AM signal reception mode.

Positive voltage lines
FM signal
AM signal
AF signal lines
FM OSC
AM OSC

IMPORTANT SAFETY NOTICE

The shaded area on this schematic diagram incorporates special features important for protection from fire and electrical shock hazards.
When servicing it is essential that only manufacturer's specified parts be used for the critical components in the shaded areas of the schematic.

■ REPLACEMENT PARTS LIST

Notes:

1. Part numbers are indicated on most mechanical parts. Please use this part number for parts order.
2. Important safety notice:
   Compoentns identified by ⚠ mark have special characteristics important for safety.
   When replacing any of these components, use only manufacturer's specified parts.
3. Bracketed indications in Ref. No. columns specify the area. Parts without these indications can be used for all areas.
4. The " Ⓢ " mark is service standard parts and may differ from production parts.
5. The parenthesized numbers in the column of description stand for the quality per set.

Areas

* [M] is available in U.S.A.
* [MC] is available in Canada.

Ref. No.	Part No.	Description
CABINET and CHASSIS PARTS		
1	SGW4650PB	Front Panel (1)
2	SGU347SA	Transparent Panel (1)
3	SBD69-2M	Knob,Bass,Trebel and Balance Control (3)
4	RJT202B	Terminal (3)
5	SGXA810M	Front Sub Panel (1)
5-1	SBC565-IM	Button,Push Switch (9)
5-2	SUS257	Spring,Button (9)
5-3	SDH553	Reflector Plate (1)
6	SFUMC10-23	Connection Rod, Volume Control (2)
7	SMP341	Holder,L.E.D. (1)
8	SHG6259-1	Rubber (4)
9	SHR415	Lock Pin (2)
10	SHR9667	Spacer (9)
11	SUW2085	Bracket (1)
12	SBZ663-1	Spacer,Bass.Treble. Balance Control (3)
13	SGX7515	Ornament,Bass.Trebel and Balance Control (1)
14	SDU89-1	Filter,FL (1)
15	SBC337-1M	Button,Power Switch (1)
16	SKC1430S1	Cabinet (1)
17	SJT345	Holder,Fuse (2)
18	SJJ71B	Jack,Headphone (1)
19	SUW2065	Bracket (1)
20	SUW2091	Bracket (1)
21[M]	SML137	Bracket,Power Transformer (1)
21[MC]	SML137-2	Bracket,Power Transformer (1)
22	SMX785	Spacer (1)
23	SHR6029	Spacer (1)
24	SUW2083	Bracket,Power Transistor (1)
25	SMX767	Spacer,Power Transistor (1)
26	SME103	Bracket (1)
27	SMN1879	Bracket,Capacitor (1)
28	SUW1907-1	Bracket (1)
29[M] ⚠	SJS9221-1	Socket,AC Outlet (2)
29[MC] ⚠	SJS9223	Socket,AC Outlet (2)
30	SMX515	Insuration Plate (1)
31	SJF4815-2	Terminal Board,Speaker (1)
32	SUW2057	Bracket (2)
33[M]	RHR111	Bushing,AC Cord (1)
33[MC]	SHR129	Bushing,AC Cord (1)
34[M] ⚠ Ⓢ	RJA9Y	AC Cord (1)
34[MC] ⚠ Ⓢ	SJA109	AC Cord (1)
35	SJB3005-1	Battery Case (1)
36	SJC7	Terminal (2)
37	SJC9	Terminal (2)
38	SGK1569-1	Label (1)
39	SQX4779	Label (1)
40	SJF3247-2N	Terminal Board,AM Loop Antenna (1)
41	SJF4419-4	Terminal Board,Antenna (1)
42	SJF3057N	Terminal Board, Tape 2,EQ (2)
43	SJF3055-5N	Terminal Board, Input,Tape1 (1)
44[M]	SGP3730-2A	Rear Panel (1)
44[MC]	SGP3730-3A	Rear Panel (1)
45	SUW2025	Bracket (1)
46	SKU10530	Bottom Board (1)
47	SKL249	Foot (4)

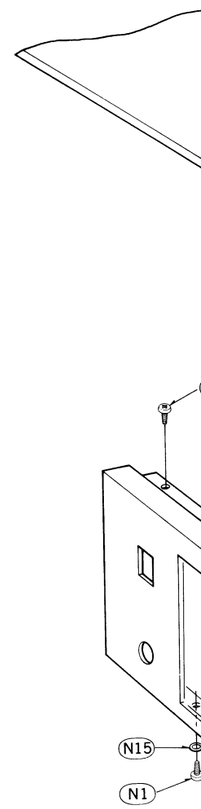
Ref. No.	Part No.	Description
SCREWS		
N1 Ⓢ	XTN3+10BFZ	Tapping,⊕3×10 (1)
N2	XTBS3+8BFZ1	Tapping with Detent, ⊕3×8 (30)
N3 Ⓢ	XSN3+8S	⊕3×8 (2)
N4	SNE2095-2	(4)
N5 Ⓢ	XTB3+8BFN	Tapping,⊕3×8 (3)
N6 Ⓢ	XSN3+6S	⊕3×6 (4)
N7 Ⓢ	XSN3+8S	⊕3×8 (1)
N8	XTW3+12JFYR	Washer Head Tapping, ⊕3×12 (3)
N9 Ⓢ	XTB4+8BFZ	Tapping,⊕4×8 (4)
N10	XTBS3+8BFYR1	Tapping with Detent, ⊕3×8 (4)
N11 Ⓢ	XTN3+8BFN	Tapping,⊕3×8 (14)
WASHERS		
N15 Ⓢ	XWG3FZ	Plain,φ3 (1)
N16 Ⓢ	XWA3B	Spring,φ3 (4)
N17 Ⓢ	XWG3FN	Plain,φ3 (14)
ACCESSORIES		
A1	SSA267-1	Cord,FM Antenna (1)
A2	SSA611-1	Loop Antenna (1)
A3	SMA231-1	Holder,Loop Antenna (1)
A4	SMA233-1	Holder,Loop Antenna (1)
A5	XTN3+10AFZ	Screw,Holder (Loop Antenna) (1)
A6[M]	SQF11681	Instruction Book (1)
A6[MC]	SQF11683	Instruction Book (1)
PACKING PARTS		
P1	SPP701	Polyethylene Bag (1)
P2	SPS3015-3	Pad,Left Side (1)
P3	SPS3017-2	Pad,Right Side (1)
P4	SPS4059	Pad,Upper (1)
P5[M]	SPG4393	Carton Box (1)
P5[MC]	SPG4395	Carton Box (1)

Ref. No.	Part No.	Description
INTEGRATED CIRCUITS		
IC1	AN6558F	Equalizer Amp
IC71	AN7062	Voltage Amp
IC201	SVIUPC1018C	FM IF & AM Convertor
IC202	SVIUPC1167C2	FM IF Det
IC301	SVIUPC1161C3	MPX
IC401,402	MN6631	Input Selector
IC403	SVIUPD4011BC	L.E.D.(Input) Controller
IC404	MN6632	Volume Controller
IC405	SVINJM2043DD	DC Amp
IC406	SVITA7612AP	Volume IND. Drive
IC407,408 501,502	SVITD62501P	Inverter,Converter
IC503	MN1421STA	ICQ Controller
IC601	SVINJ4559DSM	Flat Amp.
IC801	AN6552F	Voltage Comparator
IC901	SVID1704C525	PLL Controller
IC902	SVIUPB553AC	Pre Scaler
IC903	AN6873N	FL Driver
IC904	SVIUPD4011BC	OSC Scan IND Controller
TRANSISTORS		
Q71,72	2SA1123-R	Driver
Q201～206,209 210,301,302,304 903,904 Ⓢ	2SC1685-Q	Switching,Signal Strength IND Driver
Q207,208,303 403～406,503 508,510,511 802～804,907 Ⓢ	2SA564AQ	FM/AM Selector, Muting,Tuner Selector Meter Drive FM/AM Selector, Muting Controller L.E.D.(Input) Driver,Switching Mono Multi Vibrator,Scan IND Drive
Q401,402	2SD1011-T	Muting
Q408,409 Ⓢ	2SA684-QNC	Regulator
Q410～413	2SJ103-GR	Tone Amp.Switch, Loudnes Switch
Q509 Ⓢ	2SC1509FR	Relay Drive
Q512,601,602 808 Ⓢ	2SC1685-Q	L.E.D.Drive,Dias Controller, Regulator
Q603～606	2SC2631-R	ICQ Controller, Pre Drive
Q607,608	2SA1123-R	Pre Drive
Q501,502,801	2SC1845	Over Road Det., Speaker Selector Drive
Q609,610	2SC2592-R	Driver
Q611,612	2SA1112-R	Driver
Q613,614	2SC3182-R	Power
Q615,616	2SA1265-R	Power
Q617,618	2SA992	ICQ Controller
Q805[M]	2SA992	Tap Relay Drive
Q805[MC] Ⓢ	2SA777-Q	Tap Relay Drive
Q806 Ⓢ	2SC1383Q	Regulator
Q807,810,811	2SD762-O	Regulator
Q809 Ⓢ	2SA684-QNC	Regulator
Q901,902 Ⓢ	2SC945-Q	Loop Filter

Ref. No.	Part No.	Description
DIODES		
D71,72,210 212～215,301,302 404～410,501～506,522,801～806, 824,901～913, 918～921 Ⓢ	MA162A	Switching
D201,202,205,527	LN446YP	L.E.D.,Signal Strength(1.2), Scan,Output (Stand-by)
D203,528	LN346GP	L.E.D.,Signal Strength(3), Output(on)
D204	LN846RP	L.E.D.,Quartz Lock
D206 Ⓢ	SVDMZ303BM	3V,Zener
D207,817,917	MA1062M	6.2V,Zener
D208	SVDKV1236Z	AM.Variable Capacitor
D211,526 603～610 Ⓢ	2OA90	Detector,Bias
D401～403,538	SVDMC921	Switching
D413,414	MA1030	3V,Zener
D415,529	LN0603GP3G	L.E.D.,Ass'y,New Class A,Computer Drive Monitor (auto)
D420～429	LN41YPHL	L.E.D.,Volume Level IND
D430,431,530	LN0202YP4	L.E.D.,Tape Monitor, Computer Drive Monitor(preheat)
D432～438	LN846RP	L.E.D.,Input Selector
D440	SVDMZ309A	9V,Zener
D523,601,602 611～614	MA27W-A	Bias
D531～537	SVDAY5533K-M	L.E.D.,Computer Drive Monitor (signal,thermal, low,high)
D615	MA1180M	18V,Zener
D808～811 ⚠ Ⓢ	SVDS3V40	Rectifier
D812～816,820 ⚠ Ⓢ	SVDSR1K2	Rectifier
D818,822 Ⓢ	SVDRD16EB	16V,Zener
D819	MA1270M	27V,Zener
D821	SVDMZ308B	8V,Zener
D825[MC] only Ⓢ	MA162A	
COILS and TRANSFORMERS		
L201	SLO2C29R-P	AM OSC
L202	SLA2C5-P	AM Antenna
L501	SLQX101-3M	Choke
L601,602	SLQY15G-30	Choke
T201	SLI4C541-Z	FMM IFT
T202	SLI4C543-Z	FM IFT
T203	SLI2C127-M	AM IFT
T204	SLI2C413R	AM IFT
T1001 ⚠	SLT5N421	Power Source
CERAMIC FILTERS		
CF201,202 203	SVFE107MM-A	FM.,10.7MHz (Red)
	SVFE107MM-D	FM.,10.65MHz (Black)
	(Use pair ranks as same as CF201,CF202 and CF203)	
CF204	SVFSFP450HT	AM 450KHz
FM FRONT END		
	SNVFE407E04	Front End Pack
VARIABLE CAPACITOR		
CT201	SVCTY121B269	Trimmer,AM Antenna

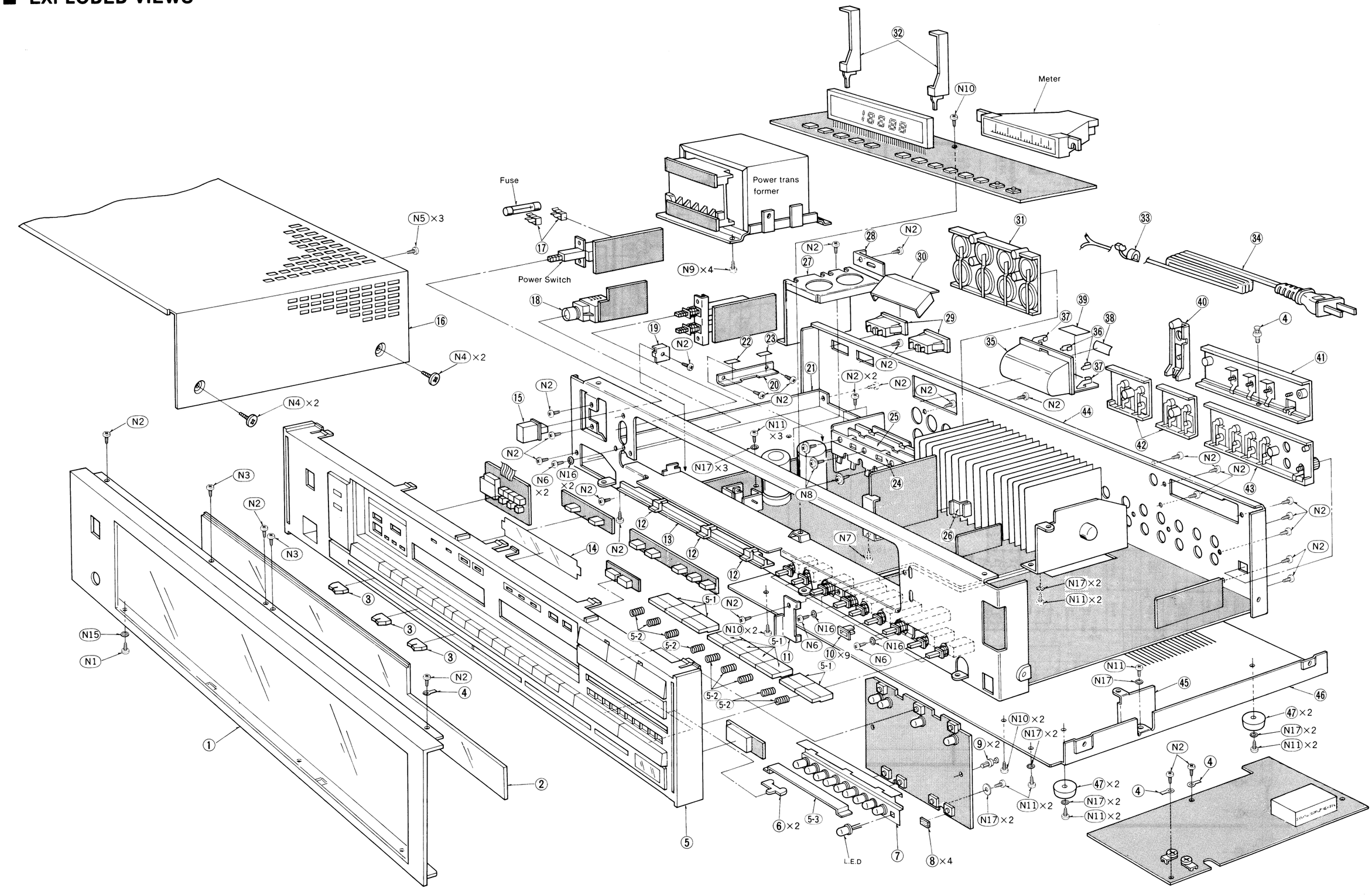
Ref. No.	Part No.	Description
VARIABLE RESISTORS		
VR201	EVN58AA00B54	Muting on Lebel Adj.,50kΩ(B)
VR301	EVN75AA00B53	VCO,5kΩ(B)
VR302	EVN58AA00B55	Separation Adj.,500kΩ(B)
VR501 Ⓢ	EVNM0AA00B14	Clock Frequency Adj.,10kΩ(B)
VR601,602	EVNK6AA00B52	ICQ Adj.,500Ω(B)
VR603	EVD00305G15S	Balance, 100kΩ(G)
VR604,605	EWD00205C15S	Bass,Treble, 100kΩ(C)
VR801,802	EVNK6AA00B14	Tap Selector, 10kΩ(B)
VR901	EVN58AA00B53	Frequency Meter Adj.,5kΩ(B)
COMPONENT COMBINATIONS		
Z201	EXRF203Z471S	0.01μF(×2),470Ω
Z301,302	EXRP181K473T	180pF,47kΩ
Z401,501	EXBP87562K	5.6kΩ(×7)
Z504	EXBP84103J	10kΩ(×4)
Z601,602	ERF3GBKR22N	3W,0.22Ω(×2)
Z901	EXBP87104M	100kΩ(×7)
Z902	EXFP7331MW	330pF(×7)
THERMISTERS		
TH601,602	RRT104	100kΩ
TH901	ERTD2ZHL103S	10kΩ
THERMAL DETECTOR		
PS501	SRPBG47101	70°C
CRYSTAL		
X	SVQ49U452-T	4.5MHz
FLUORESCENT DISPLAY TUBE		
FL	SAD7MT29ZA	
METER		
	SSM175-4	Frequency Meter with Lamp (8V,150mA)
RELAYS		
RLY801 ⚠	SSY107-1	Speaker
RLY802[M] ⚠	SSY109-1	Transformer Tap Selector of Secondary
RLY802[MC] ⚠	SSY119	Transformer Tap Selector of Secondary
RLY803[MC] only ⚠	SSY119	Transformer Tap Selector of Secondary
LAMPS		
PL401,402 ⚠	XAMR68S8	Volume Control (8V,0.07A)
FUSE		
F1 ⚠	XBA1F50NU14	Power Source, 125V.5A
SWITCHES		
S2～14 410～416	SSG13	Band Selector, Tuning,Memory Preset Tuning, Input Selector & Volume Control
S401	SSH1101	Audio Muting
S402	SSH1031	Loudness
S403～406	SSH453	Graphic Equalizer Control,Tape Monitor Selector
S601,602,603	SSH1031	FM Muting/FM Mode Selector, High Cut Filter, Subsonic Filter
S604,605	SSH2059	Speaker Selector
S1001 ⚠	SSH1071	Power Source

■ EXPLODED



■ EXPLODED VIEWS

Description
Muting on Lebel
Adj.,50kΩ(B)
VCO,5kΩ(B)
Separation
Adj.,500kΩ(B)
Clock Frequency
Adj.,10kΩ(B)
ICQ Adj.,500Ω(B)
Balance,
100kΩ(G)
Bass,Treble,
100kΩ(C)
Tap Selector,
10kΩ(B)
Frequency Meter
Adj.,5kΩ(B)
0.01μF(×2),470Ω
180pF,47kΩ
5.6kΩ(×7)
10kΩ(×4)
3W,0.22Ω(×2)
100kΩ(×7)
330pF(×7)
100kΩ
10kΩ
70°C
4.5MHz
Frequency Meter
with Lamp
(8V,150mA)
Speaker
Transformer Tap
Selector of
Secondary
Transformer Tap
Selector of
Secondary
Transformer Tap
Selector of
Secondary
Volume Control
(8V,0.07A)
Power Source,
125V.5A
Band Selector,
Tuning,Memory
Preset Tuning,
Input Selector &
Volume Control
Audio Muting
Loudness
Graphic Equalizer
Control,Tape
Monitor Selector
FM Muting/FM
Mode Selector,
High Cut Filter,
Subsonic Filter
Speaker Selector
Power Source



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